

LightWave/WorldBuilder Communicator



**Scene Communication and Project Sharing for
*LightWave 7.5 and WorldBuilder Pro 3.55***

Developed By SUE "Strela"

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1 Introduction

The LightWave/WorldBuilder Communicator (LWC) revolutionizes importing and exporting between packages, by allowing LightWave and WorldBuilder users to share scene data and utilize the strength of each package. The communicator supports joint rendering of 3D-packages with fusion of images at the level of Z-buffers or A- buffers.

With LWC, users no longer import and export objects in the traditional sense. Rather, they create a combined project file, which shares camera paths, lighting, and shadows between both scenes. Each package renders part of the scene in its native renderer. LWC composites the renders together for the user, creating a single scene. All the objects are transferred and received with animation support.

The following items are shared communicated between scenes:

- Mesh objects (Mesh),
- Light sources (Light),
- Cameras (Camera),
- Null objects and
- Other objects, which are bound by a bounding box.

1.1 Compatibility and Components

LWC is PC-only and is compatible with Windows-based operating systems including Windows 2000, Windows NT, Windows Millennium and Windows XP. LWC works with projects created in Lightwave 7.0 and higher and World Builder 3.55. It consists of the following components:

- Communication server (Server),
- User interface of communication server (UI),
- Plugin for LightWave 7.5 (LW plugin) and
- Plugin for WorldBuilder Pro 3.55 (WB plugin).

1.2 System Requirements

This represents the system requirements LWC. WorldBuilder Pro and LightWave may have additional system requirements to function properly.

Minimum:

Processor	Pentium II 400MHz
Memory	128 Mb
Free disc space	1Mb
Operating system	Windows 2000/Windows XP

Recommended:

Processor	Pentium IV 1400 MHz
Memory	512 Mb
Free disc space	17Mb
Operating system	Windows 2000/Windows XP

2 Installation

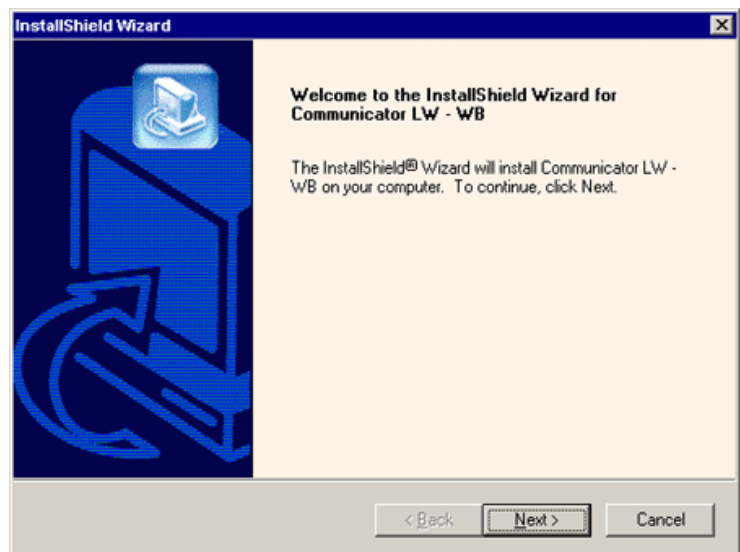
2.1 General Installation of *LW-WB Communicator*

To install the *LW-WB Communicator* you need to have LightWave 7.5 and WorldBuilder Pro 3.55 already installed on the workstation. The following files will be installed on the computer:

Comm30LW.p	Plugin for LW
CommObject.bem	Plugin for WB
CommServer.exe	Communication server
CommUI.exe	User interface of communication server
LWWB.doc	Operating document (Word document)
LWWB.pdf	Operating document (Adobe document)
LWWB.chm	Electronic help system
Demo&Tutorial	Demo and tutorial Web-pages

To install the software components of *LW-WB Communicator*, run the program **CommLW-WB.exe** and follow some easy steps.

From the window prompting the installation click '**Next>**'



Enter required parameters:

Communicator Install

Please enter your name, company, and product serial number.

User Name:

Company Name:

Serial Number:

InstallShield

< Back Next > Cancel

The installation program will install *LW_WB Communicator* into the directory of your choice.
The default directory is
C:\...\Digital Element-Strela\Communicator LW-WB.

Choose Destination Location

Select folder where Setup will install files.

Setup will install Communicator LW - WB in the following folder.

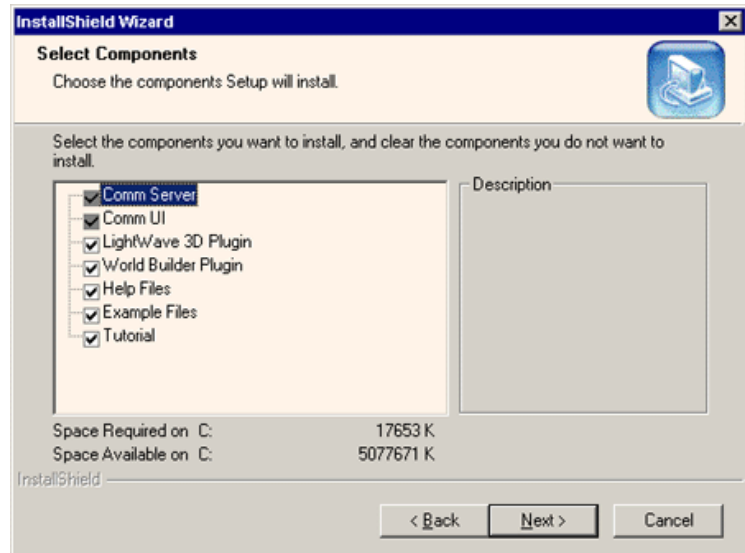
To install to this folder, click Next. To install to a different folder, click Browse and select another folder.

Destination Folder
C:\...\Digital Element-Strela\Communicator LW - WB Browse...

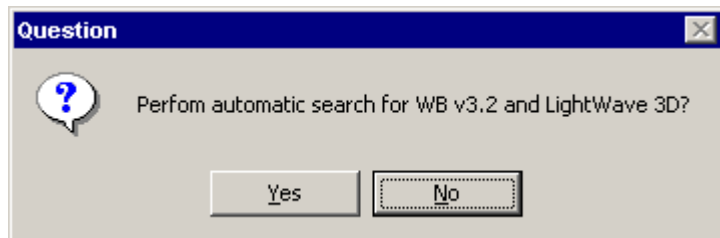
InstallShield

< Back Next > Cancel

In the proposed list of the components for installing *LW-WB Communicator* select the desired components. All the components are indicated chosen by default. To continue click '**Next>**' button:

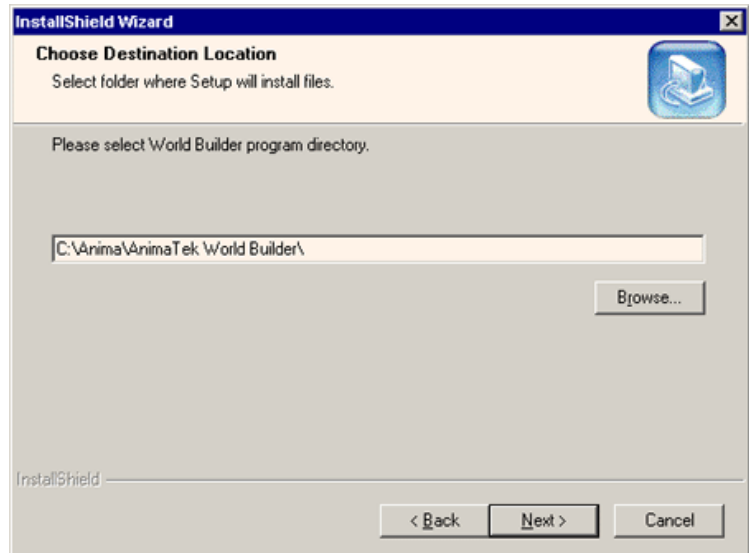


The program prompts automatic finding the path to the installed packages WorldBuilder Pro 3.55 and LightWave 7.5. In case you agree click '**Yes**' button. If you click '**No**' button, the program will prompt to manually select the path to the packages.



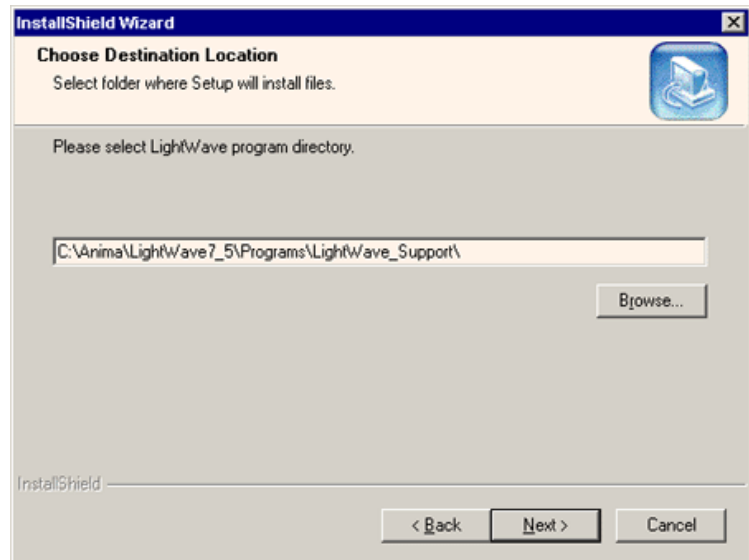
If you select the automatic alternative, click '**Next>**' button in the below window:

Alternatively, indicate the path manually.



Click '**Next>**' button in the below window:

Alternatively, indicate the path manually.



The installation wizard will then copy the following:

- The file of WB plugin **CommObject.bem** into the directory: **C:\Program Files*<Digital Element>*\AnimaTek WorldBuilder;**
- The file of LW plugin **Comm30LW.p** into the plugin directory: **<C:>\<LightWave Folder>\Programs\Plugins\Comm.**
- The communication server file **CommServer.exe** is placed into the directory :
C:\Program Files\Common Files\Digital Element

- The communication server file **CommUI.exe** is placed into the **Windows** system directory and is automatically recorded in the operating system.

To finish the general installation click '**Finish**' button in the below window:



At any stage of the installation you may

- Move one step backward with '**<Back**' button,
- Abort the installation with '**Cancel**' button.

2.2 Security


When installing LW plugin user name and serial number is requested.

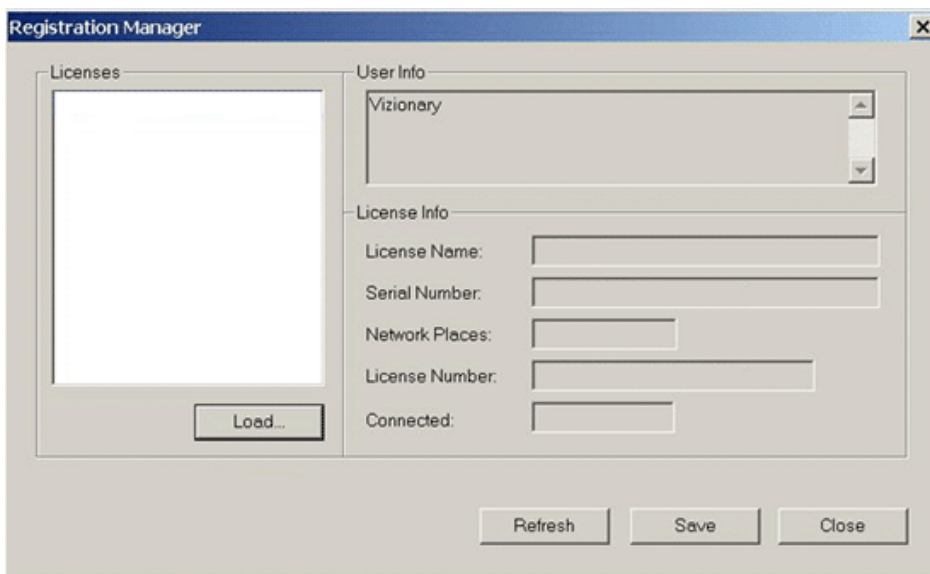
User takes request to the supplier, where gives a name and a serial number. When the license file (*.lic) is got from the supplier, it must be saved in any place on the user's machine.

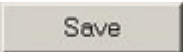
Then LW plugin must be registered at the server.

To do this:

1. Run the program **RegManagerUI.exe**.

2. In the dialog box "**Registration Manager**" click the button . In the opened dialogue discover a file.



3. Click the button  in the dialog box "**Registration Manager**".

4. Close the dialog box of the program **RegManagerUI.exe**.

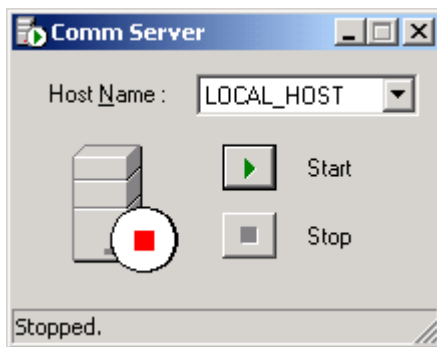
The registration of LW plugin is now finished.

When starting LW plugin the availability of the license file is checked at first. If it is available, the correctness of the license and its availability at the server is checked. If something is wrong, the message is sent telling about a mistake nature.

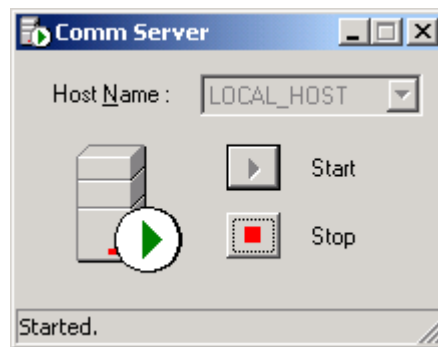
2.3 Loading the Communication Server

The communication server (**CommServer.exe**) represents a separate communicator component placed on one of computers in a network or on the local computer. The communication server facilitates interaction between the rest of the components of the Communicator and controls the interaction. All other communicator components interact with server using sockets based on the TCP/ IP protocol.



Control dialog of the communication server:



Off mode



On mode

The communication server may be turned either on or off. To switch between the modes use the buttons  **Start** and  **Stop**.

For the server to operate, specify one parameter:

Host Name When on a network with network rendering, select the network name of the host server from the list of computers visible on the network. When working on a local computer without network rendering, you should select LOCAL HOST.

2.4 Loading LW Plugin

The first installation of the LW plugin in LightWave 7.5 is made manually. Below follows the sequence of actions for manual installation:

1. Run the application LightWave Layout.
2. Select menu: **Layout --> Plug-ins --> Add Plug-ins...** and in the window '**Add Plug-ins**' select **Comm30LW.p**.
3. Select menu **Layout --> Interface --> Edit menu Layout...**
4. In the window **Configure Menus** select the menu item **Plug-ins** from the left list **Command**:

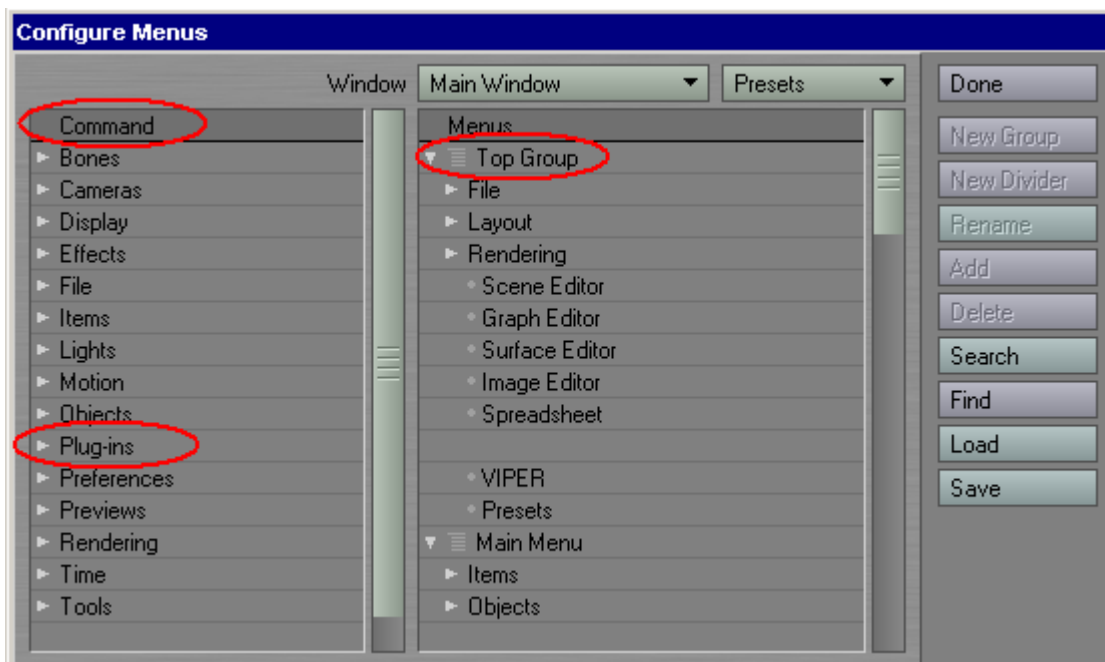


Fig. 1 Loading of LW plugin.

5. Open the menu item **Top Group** in the right list **Menus**.
6. Select the menu item **CommunicatorLW** in the list **Command** by clicking the left mouse button, and holding the button drop the menu item to the right onto the item **Top Group** of the list **Menus**:

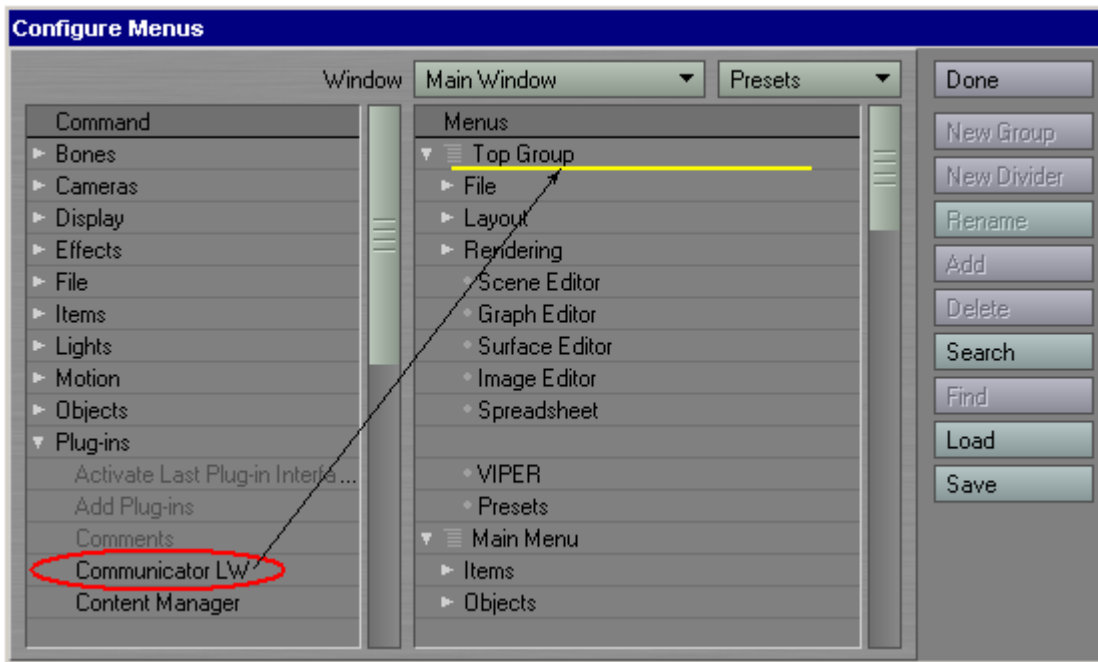


Fig. 2 Referencing of the button for calling for LW plugin to LightWave Layout interface.

7. Release the left mouse button at the menu item **Top Group** and close the dialogue with **Done** button.
8. The button **Communicator LW** will appear to the left of the command panel of the main LightWave Layout interface (in Figure the given button is marked):

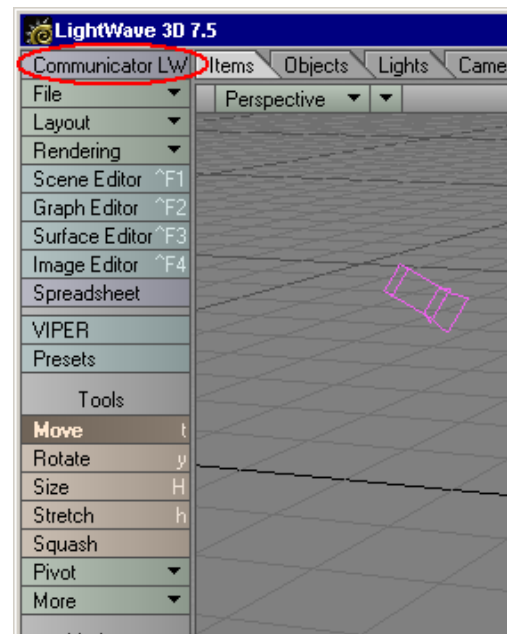
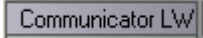


Fig. 3 The button for calling the interface for setting parameters and calling the session for connecting to server and communicator loading is added into LightWave Layout interface.

9. Press the button  and LWC will be loaded and the user interface will be called for setting parameters of the session of plugin LW connecting to communication server.

Note: When updating LWC, running the installation program **CommLW-WB.exe** results in the automatic installation of the LW plugin within Lightwave Layout 7.5.

2.5 Connecting LW Plugin to Communication Server


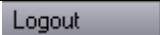

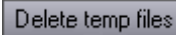
The installation of the *LW-WB Communicator* and LW plugin results in the dialog box for setting the parameters of the session of connection of LW plugin to communication server (Fig. 4).




Fig. 4 Dialog box in LightWave for setting parameters for session of connection of LW plugin to communication server.

Description of the input fields and buttons.

Session	Since the server can support a large number of workstations and sessions (projects) running simultaneously, users need to enter a unique name for each project. Workstations accessing identical session names operate jointly. A given workstation does not see workstations that participate in other projects (with different session identifiers). When the plugin is connected to the server, the availability of a session with a given name is checked. If such session is not present, it is created with specified parameters. The default session name is «session». At the beginning of the operation the input field is accessible. If the connection is a success, it becomes inaccessible.
Password	Prevents an unintentional connection to a session. If while connecting to the server the session specified by a user is already available, then the passwords coincidence is checked, and if they coincide in their turn, the connecting goes on; otherwise the error message appears. The default password is «password». At the beginning of the operation the input field is accessible. If the connection is a success, it becomes inaccessible.
UID	“Package Name” Within a session, each connected package has its unique name specified by the user. With this name the server identifies the objects, which are transferred through it. The check for uniqueness of a package name takes place immediately after checking session name and password. In the case of duplicate package name, the user receives a message about non-uniqueness of the package name. At the beginning of the operation the input field is accessible. If the connection is a success, it becomes inaccessible.

Server path	“Network Path” The communication server may be placed on any machine within a network. A user may specify the computer where the server is placed. At the beginning of the operation the input field is accessible. If the connection is a success, it becomes inaccessible.
Go	 If pressed, workstation attempts to connect to the server with the specified parameters. At the beginning of the operation the button is clickable. If the connection is a success, it becomes unclickable.
Logout	 Disconnects the workstation from the server. At the beginning of the operation the button is unclickable. If the connection is a success, it becomes clickable.
User Interface	 Brings up the server user interface. At the beginning of the operation the button is unclickable. If the connection is a success, it becomes clickable. On successful connection to the communication, you may call the server user interface UI and proceed to manipulating with the scene objects.
Delete Temporary Files	 The files are deleted from the temporary directory. At the beginning of the operation the button is unclickable, if the temporary directory does not include files with the extensions beginning with 'lw' (*.lwo , *.lws and others). At the beginning of work the directory is typically empty. Having been pressed the button becomes unclickable.

2.6 Loading WB Plugin

1. Load the package WorldBuilder Pro 3.55.
2.  Click this button on the left vertical functional panel in the main WorldBuilder interface. WB plugin in WorldBuilder Pro 3.55 package will load:

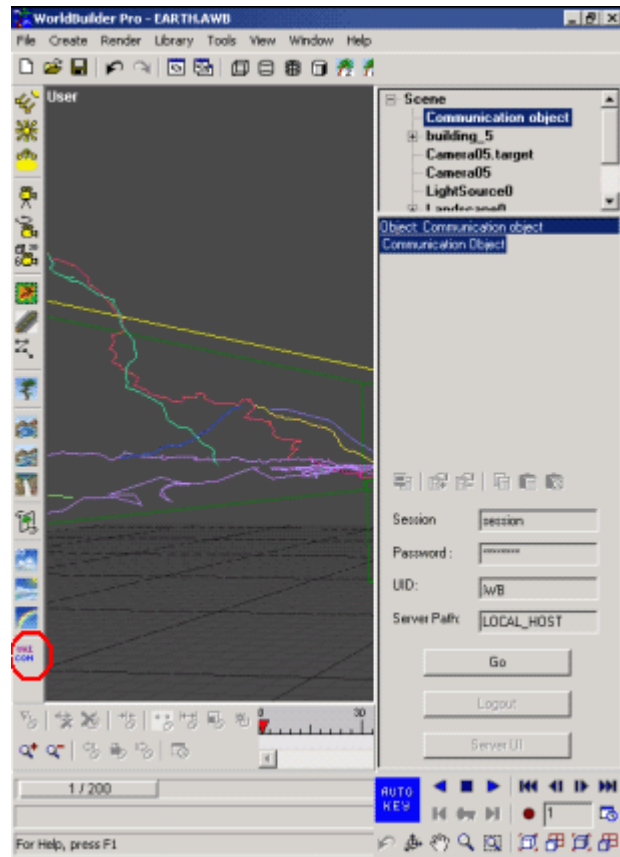



Fig. 5 Main WorldBuilder interface with marked **UNICOM** button.

At this the user interface of WB communicator plugin is called (Fig. 6).

Fig. 6 Dialog box in WorldBuilder for setting parameters for session of connection of WB plugin to communication server.



The dialog box contains the following elements:

- Session:
- Password:
- UID:
- Server Path:
- Buttons: Go, Logout, Server UI

2.7 Connecting WB Plugin to Communication Server

The loading of WB plugin results in the dialog box for setting the parameters of the connection session with the WB plugin and the communication server

- With the input fields: *Session* («*session name*»), *Password* («*password*»), *UID* («*package name*»), *Server path* («*network path*») and
- With the buttons *Go* («*Go*»), *Logout* («*Logout*»), *Server UI* («*User Interface*»).

The functionality of the input fields and the buttons is similar to the description for LW plugin presented in section 2.5, except that there is no button *Delete temp files*.

3 User Interface of Communication Server

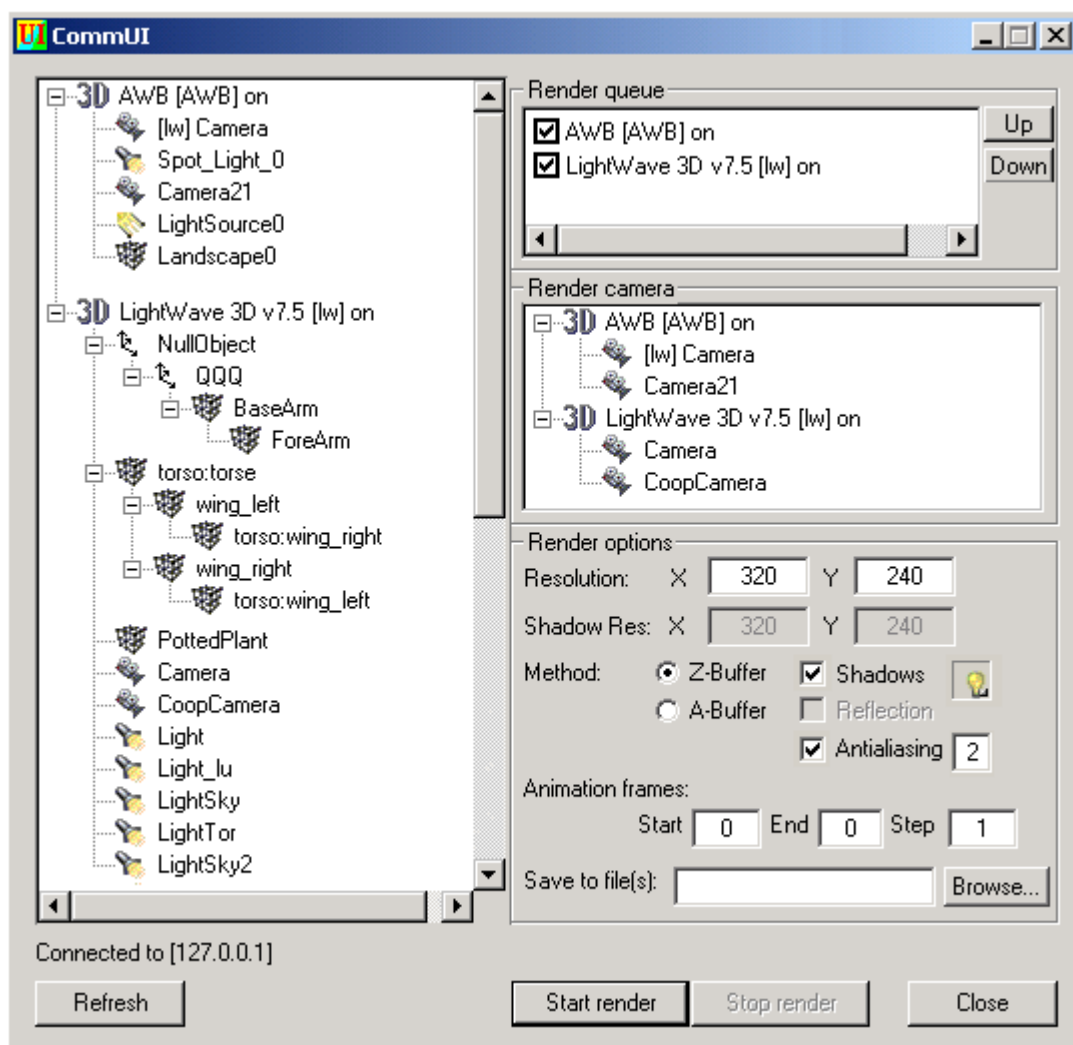


Fig. 7. Example of interface of communication server with objects transferred from one package into another.

The user interface window of the communication server is divided functionally into the two parts:

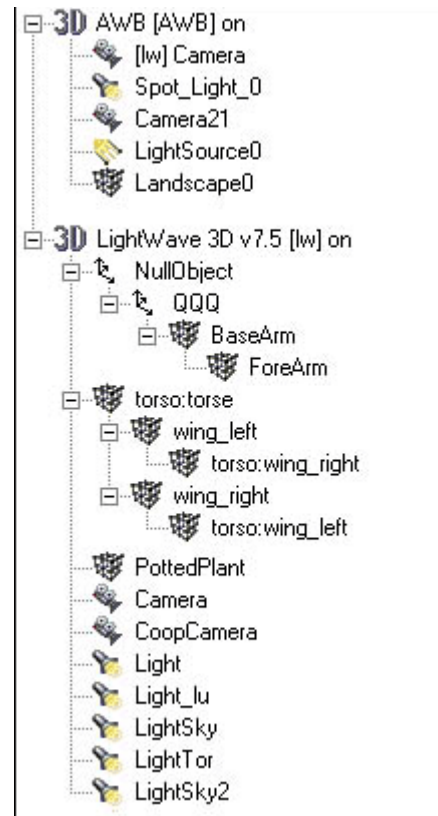
- **Scene objects.** A left panel for manipulating with scene objects.
- **Render panels.** Panels for setting parameters and starting joint rendering.

Note. Before starting operating with the communicator open 3D-packages, download demoscenes and reduce the packages to the common system of units!

4 Manipulations with Scene Objects

In the left part of the window of the user interface of the communication server "**CommUI**" there is an object lists for each package.

The lists are organized in a hierarchical trees. Any object may act as a parent and have children (slaves). The number of children levels is not limited. The hierarchical structure provides control when manipulating objects of two different packages.



The following manipulations may be done with objects:

- Transferring objects
- Deleting objects
- Modifying dimensions

If you click with the right button into the list box of packages objects a popup menu is displayed providing commands for manipulations with objects, synchronization and updating objects lists.

Transferring objects

Transferring an object:

1. Select the object from the Object Tree of one of the two packages by clicking the **left mouse button**.
2. Hold the button and drag the object to the required level of the Object Tree of the other package.
3. Release the mouse button. The object will be copied into the list of the second package.

Simultaneous transfer of several objects:

Transfer procedure is similar to that described above:

1. Several objects are selected with **Ctrl-left click**.
2. A parent object is transferred with all its children.

When being transferred the object is assigned a name, which is formed according to the following principle:

"[" package name (UID field in plugin interface) "]"
+
space (_)
+
original name of the object in a package.

When transferring polygonal objects into LightWave from WorldBuilder the names, which are assigned to the objects, differ with an underlining symbol (_) instead of a space.


Example:
If a polygonal object with the name "**Landscape()**" is transferred from WorldBuilder package with UID «**wb**» the object name will be formed:
«**[wb]_Landscape()**»

Objects may be transferred with the commands from the popup menu.

Note. Before transferring objects it is necessary to set in all 3D-packages the unified system of units of measurement!

Deleting objects

To delete one or more objects from a scene, mark the objects with the mouse and press the **Del** key.

If a scene object is deleted in a package itself, then to update the object list click the button  in the bottom left corner of the window of the user interface of the communication server "**CommUI**" (Fig. 7).

Objects may be deleted from the popup menu.

Modifying dimensions

When an object has been transferred, it may be necessary to modify its dimensions. To do this one may:

- Use the appropriate tools of the package, into which it (the object) was transferred;
- Modify beforehand the location of the object and its scale before it is transferred into another package.

Popup menu




- Copy** The command copies a selected object or several selected objects into the buffer. If you select a parent object, all its children are copied.
- CopyOne** The command copies a selected object into the buffer. If you select several objects without children simultaneously, they are all copied. If you select a parent object, its children are not copied.
- Paste** The command pastes information from the buffer into the specified place in the list.
- Delete** The command deletes the selected objects from the list. If you select a parent object, all its children are deleted as well.
- SyncCopy** The command updates the object copies in other packages.
- SyncOriginal** The command updates the original.
- Refresh** The command updates the objects lists under any changes of scene in package.

Note. When some animated objects are transferred from one package into another, one should remember that in different packages a different number of frames and different numbers of the startup frame are specified by default, therefore one should trace carefully the installation of these parameters in the packages, with which communication is performed. Otherwise the animation of the scene objects may be distorted.

5 Temporary Directory

Transferring polygonal objects into LightWave from WorldBuilder is possible only with files of special format, from the so-called *object files* (*.lwo). Within LightWave, the transfer of all objects between software components of this package (Modeler and Layout) is performed through these files.

A temporary directory is automatically created to save these files with the transferred objects when they are transferred through the communicator from WorldBuilder into LightWave.

Files accumulate in the temporary directory until the user decides to clear the temp directory by clicking the button . Object files cannot be deleted automatically since after they have been transferred into LightWave they are to be available for operation.

The name of the temporary directory is **comm_tmp** and it is placed in a directory, which contains the executable LightWave files (Layout.exe, Modeler.exe and others) and dynamically downloaded LightWave libraries.

If the package LightWave 7.5 is installed into the directory **C:\LightWave**, the path to the temporary files will be:

C:\LightWave\Programs\LightWave_Support\comm_tmp.

Note. Transfer of objects from LightWave into World Builder does not result in creating such files.

6 Joint Rendering

Joint rendering matches rendered scene objects between packages during the rendering process by sharing cameras, light sources, etc. of the respective packages. LWC composites the results of scene objects' renderings in each package. In other words, LWC merges the Z-buffers and/or A-buffers of the packages.

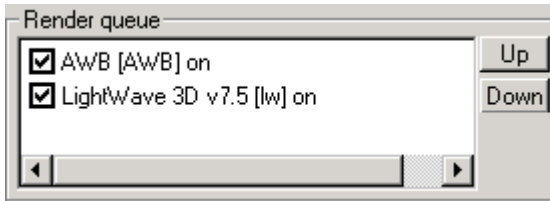
If rendering was absent in one of the packages, then the result of joint rendering is the rendering of that package in which the rendering took place. If rendering took place in both packages, then the result will be the combination of the two renderings.

In order to construct correctly objects' shadows in the combined scene, light sources need to be exchanged between packages and, depending on the package, to adjust the parameters responsible for shadows formation (for example, in World Builder for the necessary light source the parameter **Shadow** is to be set to **ON**).

For joint rendering of the scene objects from different packages there are three panels for setting parameters in the window of user interface of communication server:

- **Render queue.** Queue of package rendering.
- **Render camera.** Camera selection.
- **Render options.** Setting of the rendering parameters.

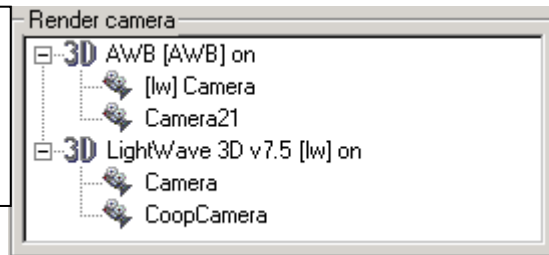
Render queue (List of packages)



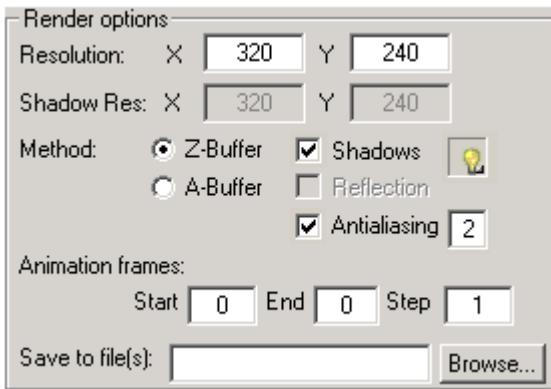
The list of package names is displayed in a panel. Each title string includes a flag. The package, the title string of which includes a flag performs rendering. If flags are set on all the packages in the list, the order of rendering will follow the order in the list. The order of packages within the list may be changed with the buttons **Up** and **Down** to the right of the panel.

Render camera (Camera selection).

On the panel a user may select a camera of one package, from which rendering will be performed. The string with a camera name indicated with a mouse will be colored marked.




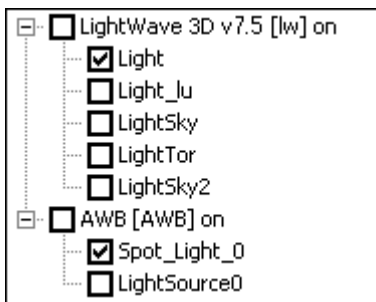
Render options



Before proceed to joint rendering a user may set the rendering parameters on that panel, namely:

Resolution	Changes the resolution of the resulting image.
Shadow Res	To adjust the resolution value for shadow masks. The default resolution value for shadow masks is equal to the resolution value for the resulting image. Is available when <input checked="" type="checkbox"/> Shadows is selected.
Method	Chooses a compositing method – <input checked="" type="radio"/> <i>Z-buffer</i> or <input type="radio"/> <i>A-buffer</i> .
<input checked="" type="checkbox"/> Shadows	Determines whether shadows will be processed.
<input checked="" type="checkbox"/> Antialiasing	Set a flag and specify the required rate of smoothing (an integer number from 1 to 7 , recommend – 3). The given antialiasing coefficient has no effect on the dimension of shadow masks.
Animation frames	Change initial and final animation frame and step if any provided.
Save to file(s)	Saves the resulting image into the chosen file.

If **Shadows** have been selected, light sources will have to be shared. To set the light sources required for shadow creation, click the button . The list of light sources of both packages will be displayed. In the displayed list set the flags at the required sources:



When the required parameters have been set, click button at the bottom of the panels to begin the joint render. The rendering will take an amount of time that varies depending on the complexity of the scenes, the power and number of stations, and the quality of the render. Clicking the button will stop the joint render.

Notes.

1. Before you run the joint render the window **"Render Status"** in LightWave must be closed! Otherwise it will be impossible to set the rendering parameters.
2. In the **"Render Options"** dialogue in LightWave, the parameter **Render Display** should be marked as **(none)**.
3. To select antialiasing mode, change the appropriate parameters in LW camera properties. When the joint rendering camera is created, these parameters will be included.
4. It's recommended to disable Lock screen.
5. For LightWave to construct shadows from other packages, in LW's dialog box **"Render Options"** enable the flag **Ray Trace Shadows**.
6. Before joint rendering, be sure to set a unified system of measurement units between WorldBuilder and LightWave.

Example 1

The following figures present the examples of separate rendering of the initial scenes in packages LightWave and WorldBuilder Pro:

Image obtained in LightWave

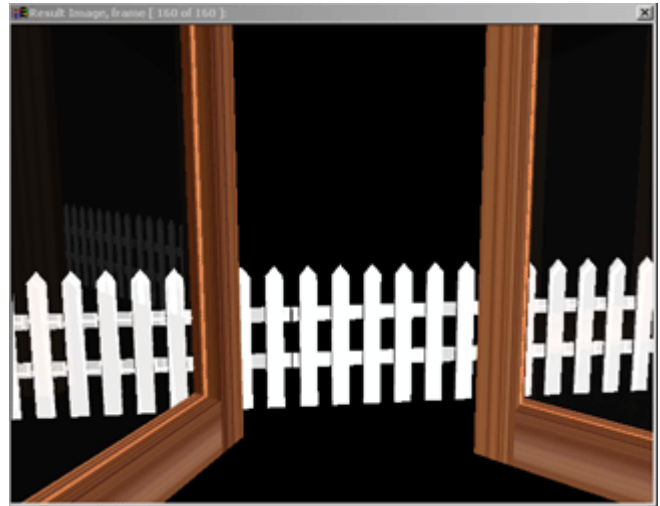
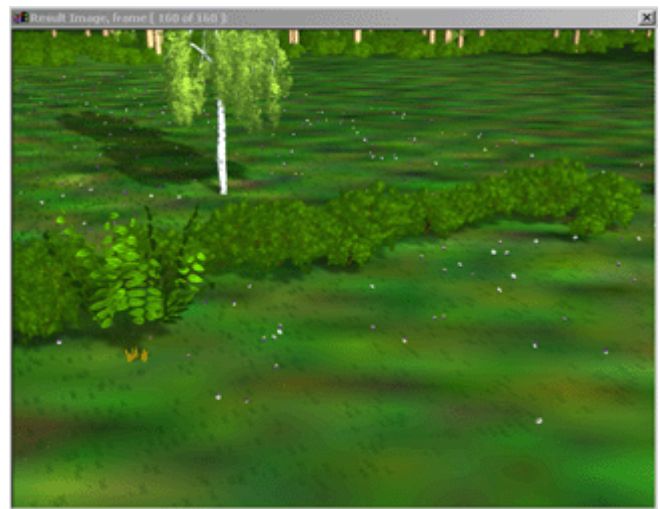


Image obtained in WorldBuilder



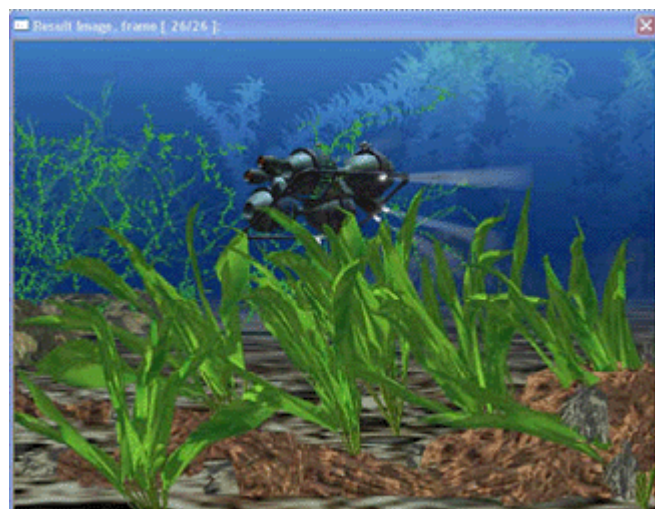
The given Figure presents the resulting image in server interface obtained by joint rendering that is by merging of two A-buffers:



Resulting image obtained by joining A-buffers under joint rendering

Example 2

One more example of the image obtained by merging of two Z-buffers with transparent objects. The bathyscaphe – an object from LightWave – is placed underwater created with WorldBuilder:



Example of joint rendering of NewTek LightWave and WorldBuilder in z-buffer mode with transparency.

Example 3

The following Figure presents the example of support of image visualization by the **A-buffer** method. What sets apart this visualization mode is the ability for full-value work with the objects with different transparency degrees. LWC uses the information about the level transparency along the line of sight while joint rendering. Note that there is a considerable increase in the time required for rendering.



Example of joint rendering of NewTek LightWave and WorldBuilder in a-buffer mode

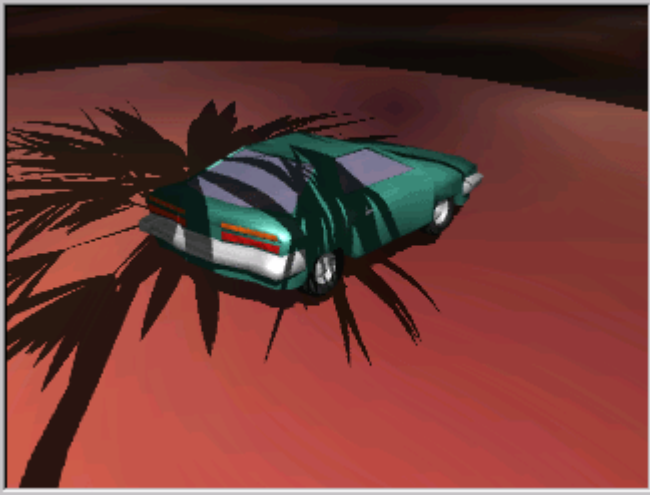
For the sake of comparison the following Figure presents the result obtained for the same scene with using **Z-buffer**:



Example of joint rendering of NewTek LightWave and WorldBuilder in z-buffer mode with transparent objects

Example 4

The following picture presents an example of shadows support in general scene. The shadow from a tree is created in WorldBuilder, the shadow from a car - in LightWave. The shadow created in WorldBuilder is imposed on the object created in LightWave, and vice versa:



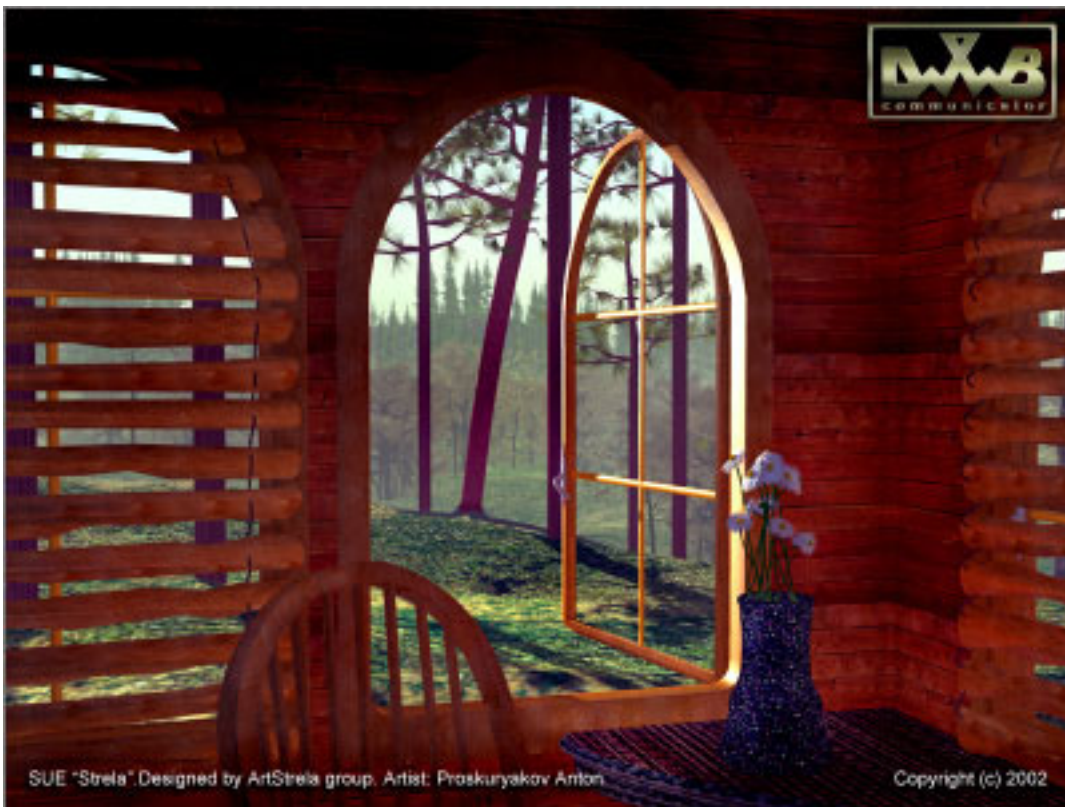
7 Demo

Demo static pictures, examples of technical, artistic and practical capabilities of communication between LightWave objects with WorldBuilder landscapes and plants:









Credits:

LightWave 3D v.7.5
USA, NewTek, Inc.

WorldBuilder Pro v.3.55
USA, Digital Element, Inc.

LW-WB Communicator
Russia, Sue "Strela",
USA, Digital Element

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