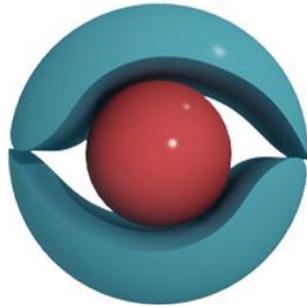


AR-media™ Plugin v2.3

for Trimble™ SketchUp™

QUICK START GUIDE

(September, 2013)



(Windows XP/Vista/7)

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1. Introduction

This guide offers the quickest way to install and begin using the AR-media™ “Augmented Reality” Plugin for SketchUp™ (ARplugin) to create compelling Augmented Reality scenes. Although this guide assumes users have a basic knowledge of SketchUp™, ARplugin can be used easily also by those who don’t have much experience with it. However, it is recommended that users consult other reference and tutorial resources eventually available. Please, feel free to move along the topic of interest without reading everything in this Guide.

2. Installing the ARplugin

To begin, download the latest standard distribution of ARplugin. This package is recommended for new ARplugin users and includes an installer that guides you through the installation process. This standard distribution comes as an executable .exe file, which automatically determines the correct system settings for ARplugin. To download and install the ARplugin please follow the steps described hereunder:

1. Login into your user account here:
http://www.inglobetechnologies.com/sketchup_login.php
2. Once logged in, download the full version of the software

Note: You can only download software that you have a license available for.

3. Once the download has completed, start the ARplugin installation by double-clicking on the installer file: `ARpluginSetupPRO.exe` (for the Professional version) or `ARpluginSetupFREE.exe` (for the FREE version). This will launch the installer. Simply follow the steps to complete the installation process.

Note: You must have administrator privileges to install and configure the software

3. Activating your License

To activate your license, you need an internet connection available and also need to use the License Manager that comes with software. The procedure will take few seconds. Please follow the steps described hereunder to avoid activation problems:

1. Make sure to have an Internet connection active
2. Locate the “**ARplugin License Manager**” in the “ARplugin (SU)” folder inside the Programs Menu
3. Launch the “**ARplugin License Manager**”. Once launched, a graphical interface will be prompted.
4. Input the *Username* and *Password* you used during the registration process

5. Press the **Activate** button

If everything works correctly, ARPlugin will be successfully activated

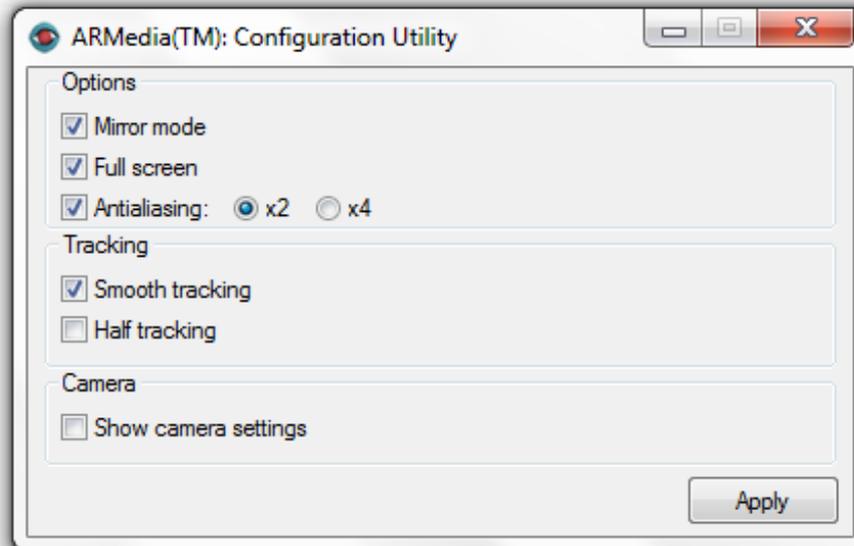
4. Getting Started

To create compelling Augmented Reality scenes using ARplugin for SketchUp™, you can rely on a set of powerful features that you will learn to use easily. With the ARplugin you can quickly create augmented reality scenes out of your SketchUp™ 3D models in few steps. What does the ARplugin allow? The ARplugin allows to:

- Set-up some Global Preferences within the design and visualization sessions
- Create single marker scenes (by associating a single model to a single marker)
- Create multiple markers scenes (by associating different 3D models to different markers)
- Use the available markers library
- Create your own markers
- Export for the AR-media™ Player
- Creating Object Occluders (virtual invisible object that serve the purpose to hide other virtual objects in the scene)
- Optimize tracking to the real lighting conditions

5. General Settings

By launching the **ARmedia Configuration Utility** in the ARmedia Folder in the Programs Menu, you can choose to set up some **global parameters** of your working environment that will affect your design session. The **ARmedia Configuration Utility** can also be accessed from within SketchUp™ by clicking the corresponding configuration button 



Enable the **“Mirror mode”** to flip the video stream horizontally (like in front of a mirror). This mode is suitable for cameras mounted in a fixed position and facing the user (like inbuilt cameras for example). If disabled the video stream will be not flipped. This other mode is suitable for head mounted displays as well as in those scenarios where the user can move the camera around.

Enable **“Full screen”** to run Augmented Reality in full screen rather than windowed mode.

Enable **“Antialiasing”** to smooth edges of your 3D models in the augmented reality views. The higher the multiplier the better your 3D models will appear but at the expense of frame rates. Video quality is not affected by this parameter.

Enable **“Smooth tracking”** to configure the tracker for using either a smooth or precise technique; if smooth tracking is enabled then objects will follow the marker in a soft manner and with a little delay, if smooth tracking is disabled then objects will be glued to the marker.

Enable **“Half tracking”** to configure the tracker for tracking a video with half the resolution of the video from the camera. This mode is useful especially when tracking high resolution images to improve the frame rate (but at the expense of a lower tracking quality).

Enable **“Show camera settings”** to adjust camera’s parameters before starting the Augmented Reality experience.

6. Creating your first Augmented Reality Scene

Creating an Augmented Reality scene with SketchUp™ has never been so simple. Please, follow the following steps to create your first augmented reality visualization:

1. Create or load any 3D model in SketchUp™
2. Clean up the scene by deleting or hiding elements that you don't want to visualize

Note: By default, the ARplugin will associate the 3D model in the work space to the standard ARmedia marker. You need to print the marker in order to visualize the AR scene. To print the marker

- open the "Markers" directory inside the ARplugin (SketchUp) folder in the Programs Menu
- open and print the file "marker_armedia.pdf"

3. Click the "View" button  to launch an Augmented Reality view of the model

Note: You need to plug-in your webcam in order to view the Augmented Reality scene.

7. Interacting with your AR Scene

During the viewer execution, you can switch between different management modalities using the function keys: each one permits you to adjust different parameters and interact with the AR scene in real-time. You can bring up an on-screen help which contains all the supported commands for the current active mode by hitting the 'h' key at any time.

The following sections will offer a brief description of how to perform some of the available operations.

Flipping the Video Frame

This is especially useful when you want to adjust to different camera and monitor configurations like in-built webcams and projectors (which are sometimes set up to flip the image output vertically).

1. Press the **F1** key to enter the *Visualization Management Mode*
2. Use the arrow keys to flip the video horizontally or vertically

Toggling between full screen and windowed frame

1. Press the **F1** key to enter the *Visualization Management Mode*
2. Press the **F** key to enter windowed or full screen mode.
3. Press the **F** key again to go back to the previous mode.

Visualizing wireframes

1. Press the **F1** key to enter the *Visualization Management Mode*
2. Press the **W** key to show your 3D models in wireframe.
3. Press the **W** key again to restore the default visualization of your models.

Scaling the 3D model

You can emphasize the details of 3D objects or adjusting the overall size of the model by scaling it up or down.

1. Press the **F2** key to enter the *Objects/Scene Interactions Mode*
2. Use the **s/S** keys to respectively scale the model down and up.

Positioning Objects Occluders in the real environment

1. Press the **F2** key to enter the *Objects/Scene Interactions Mode*
2. Press the **O** key to show occluder objects
3. Adjust the position of real objects in the environment to fit the exact position of the modeled occluder objects.
4. Press the **O** key again to hide occluder objects.

Displaying a video in full screen

ARPlugin offers the possibility to create 3D objects which can embed video textures on them. During the AR visualization, you can configure a video object to show its video texture in full screen just like a normal video, thus hiding the camera frame and any other 3D object.

1. Press the **F2** key to enter *Objects/Scene Interactions Mode*
2. While the video is in full screen, press the **F** key to restore the default AR visualization
3. Press the **F** key again to restore the full screen video playback.

Playing selected audio tracks

Once a custom soundtrack has been correctly configured by using ARPlugin, you can interact with it during the Augmented Reality visualization:

1. Press the **F4** key to enter the *Sounds Management Mode*
2. Press the **Return/Enter** key to start the audio playback (pressing the same key again will stop it)
3. Use the arrow keys to jump to the desired track: left/down and right/up will respectively jump to the previous and next track
4. If you want to restart the playback of the current track, press the **Backspace** key

Displaying a sequence of 3D objects

Once you used ARPlugin to correctly place your 3D objects in different layers, you can interact with it during the Augmented Reality visualization:

1. Press the **F5** key to enter the *Layers/Sequences Management Mode*
2. Press the **Return/Enter** key to enter the *Sequence Mode*: this mode displays each layer for five seconds¹, then it hides the current layer and displays the next one
3. If you want to temporarily pause the sequence, press the **Spacebar** key. Pressing it again will restore the sequence's playback.

Hiding/Showing a layer

1. Press the **F5** key to enter the *Layers/Sequences Management Mode*
2. Press the number key (0 through 9) corresponding to the layer number you want to hide/show

¹ This amount of time can be modified for each layer by using the ARPlugin Layers' Management Panel.

3. Press the same key again to show/hide it again

Hiding/Showing all layers

1. Press the **F5** key to enter the *Layers/Sequences Management Mode*
2. Press the **U** key to hide all layers
3. Press the **SHIFT+U** key to show all layers again

Sectioning 3D objects

1. Press the **F6** key to enter the *Clipping Management Mode*
2. Press the **Return/Enter** key to enable *Clipping mode*
3. Select one of the clipping plane by pressing the **CTRL+(1..6)** keys
4. Use the **down** and **up** keys to move the selected clipping plane respectively away and towards the marker
5. Use the **left** and **right** keys to rotate the selected clipping plane respectively clockwise and counter-clockwise with respect to the marker's center.
6. Press the **Return/Enter** key again to disable *Clipping mode*

Increase tracking performances

Two parameter must be taken into account when improving tracking performances: objects' stickiness and jittering: the higher the first factor is, the more all the objects will strictly follow the markers' movements (even the ones that are due to the camera adjustments to the lighting conditions). This may result in 3D objects which appear unstable, thus causing a jittering effect.

ARPlugin permits you to adjust what is called the *Smoothing effect*: the higher this value is, the more the jittering will be reduced (3D objects will tend to remain to their position despite marker movements).

1. Press the **F7** key to enter the *Tracking Management Mode*
2. Use the up/down arrow keys to respectively increase objects' stickiness to the marker and reduce objects' jittering

Adjusting light's position in the scene

When the 3D model contains the sunlight information which cast shadows on other objects, you can interact with it during the Augmented Reality visualization:

1. Press the **F8** key to enter the *Lighting Management Mode*
2. Ensure that the marker which has the light is visible in the camera
3. Press the **Spacebar** key to view the current light's position in the scene. A 3-axis figure representing the light source will show up
4. Press the **Q/A** keys to rotate the light source around its local X axis
5. Press the **W/S** keys to rotate the light source around its local Y axis
6. Press the **E/D** keys to rotate the light source around its local Z axis
7. When you are satisfied with the new position of the light source, press the **Spacebar** key again to hide the 3-axis figure.

Displaying soft shadows

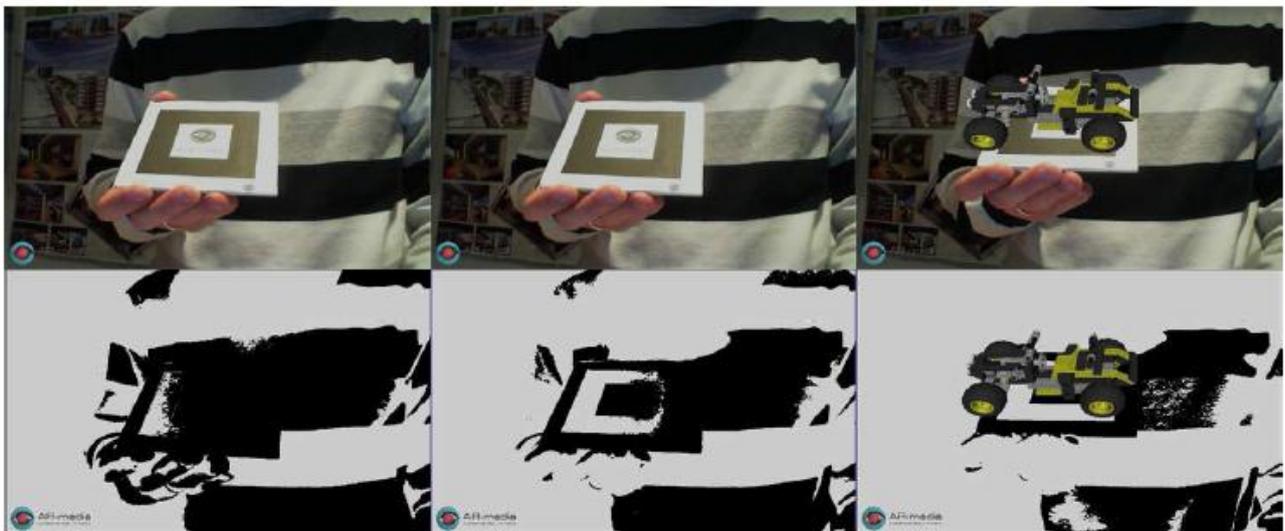
1. Press the **F8** key to enter the *Lighting Management Mode*
2. Press the **CTRL+2** keys to enable soft shadows visualization.
3. If you notice a performance's reduction, you may need to set the visual accuracy mode to "fastest" by pressing the **ALT+1** key.

If even in the “fastest” visualization accuracy mode performances are not reasonable, you may need to set back the “Simple” shadows visualization by pressing the **CTRL+1** keys.

8. Adapting to Environmental Lighting conditions (Lighting Debug Mode)

It may happen that default parameter settings are not suitable to real environmental lighting conditions thus impeding the correct visualization of the Augmented Reality scene. The **Lighting Debug Mode** allows you to adjust tracking responsivity as a function of real lighting conditions by modifying a **lighting threshold parameter**. Modifying the lighting threshold will allow you to recognize the marker even in bad lighting conditions (too dark or too lit environments) and it is useful if used in combination with the lighting debug mode. To adjust the lighting threshold, enter the “Tracking Management Mode” and use the “+” and “-” keys:

- Key “**d**” to toggle to Lighting Debug Mode
- Key “**+**” to increase the lighting threshold
- Key “**-**” to decrease the lighting threshold



Lighting Debug Mode in Action: the images at the bottom give you a visual feedback that helps you to adjust the lighting threshold to make the marker recognizable.

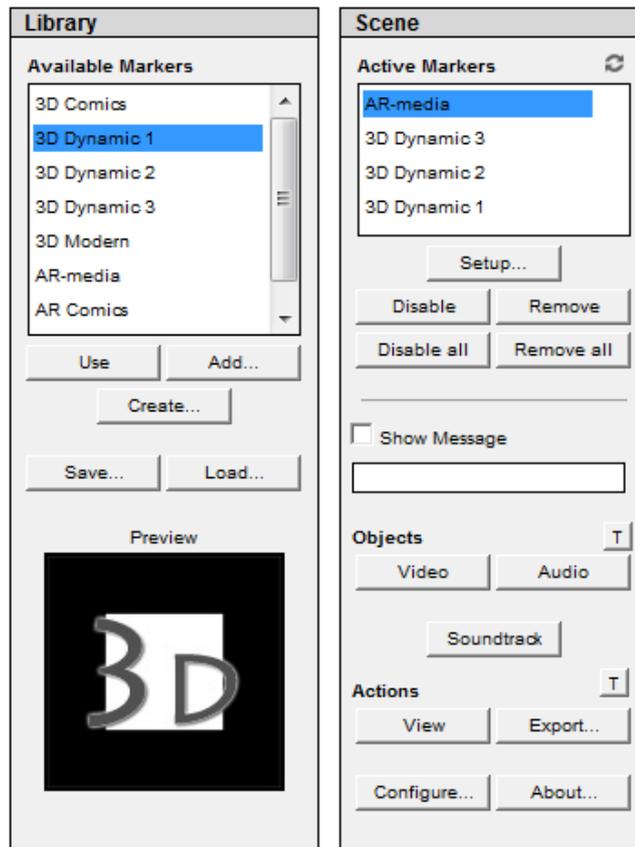
9. Setting up a Multiple Markers Scene

Creating a multiple markers scene with ARplugin is easy. To create a multiple markers scene you need to resort to a suitable markers library. There is a default markers library available in ARplugin. However you can add your custom markers to the library, inside the main interface that you open by clicking the “**Setup**”

button .

In order to create a **multiple markers scene** you have to follow the few steps below:

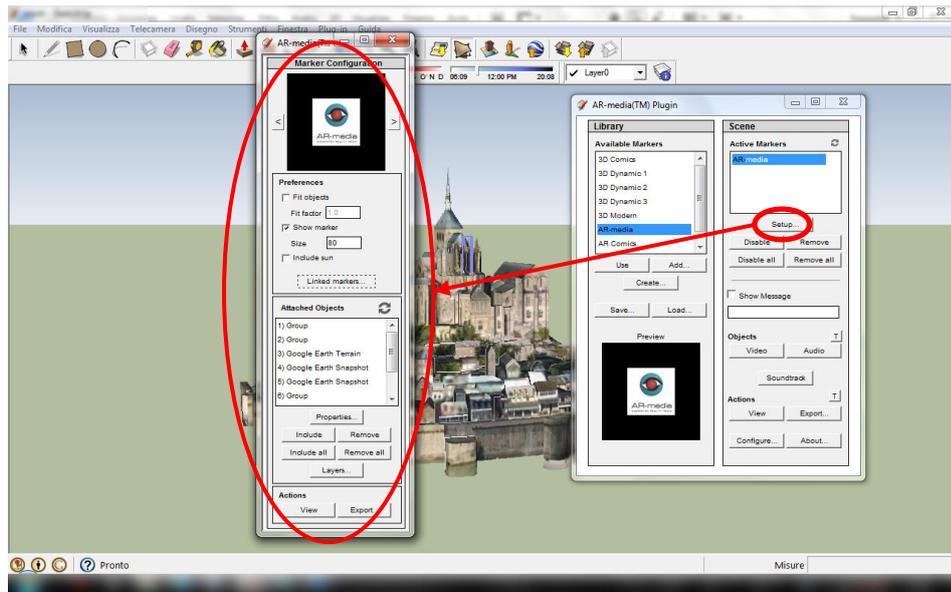
1. Create or load any 3D model in SketchUp™
2. Clean up the scene by deleting or hiding elements that you don't want to visualize
3. Group elements in bundles that you want to visualize separately as associated to different markers
4. Click the **“Setup”** Button  to open the main interface:



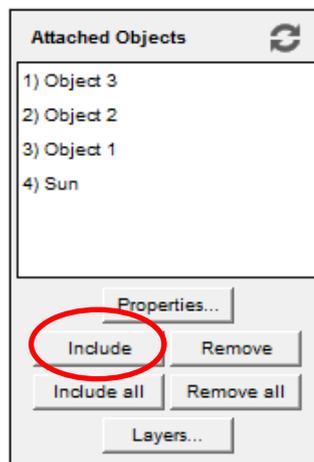
5. Click the **“Use”** button under the *Library* (Available Markers) list to add a marker to the current scene. You can add as many markers as required.

Note: You need to include as many markers as the number of groups you want to track independently. Also make sure that all the objects attached to a marker have different names, otherwise they could not be displayed in the desired way during the Augmented Reality experience.

6. Once added, a marker will be listed in the **“Active Markers”** in the list. To associate a group of objects to a marker, select the reference marker and click the **“Setup”** button located under the *Active Markers* list
7. Once clicked on the Setup button, the **Marker Configuration Window** will pop-up



8. You can scroll the active markers in the upper part of the Marker Configuration Window by clicking on the “<” and “>” buttons
9. To associate a group or object to the selected active marker you have to select in the scene the groups/objects you want to associate to the marker and click on the “Include” button



10. Once included, the object will appear in the list of the “**Attached Objects**” that correspond to the given marker. You might want to enable the “**Fit objects**” function in the preferences to constrain both position and scale of the model with respect to the marker. You can also generate a preview of the marker in augmented reality by clicking on the “**View**” button in the Marker Configuration Window.

Note: ARplugin allows users to manage objects relations to the markers in two different ways:

- a) **Fit Objects:** this option allows to scale all the attached object so that they will always be visible with respect to the marker.
- b) **Show Marker:** a reference marker will be shown in the scene, you can use it as a reference to place and scale objects before actually viewing or exporting them for Augmented Reality (the marker won't be displayed or exported). The quantity inside the box refers to the measuring units currently used in your SketchUp scene. To correctly configure your AR scene, you can freely translate and rotate the reference marker.

11. To attach different groups/objects to different markers, scroll the list of active markers and just repeat the same procedure as above.
12. To visualize the complete scene, just click the “**View**” button in the Main Interface listed under “**Actions**”.

Note: Preparing a compelling Augmented Reality scene may require a little work on your side mostly regarding the correct placement and scaling of 3D models with respect to the reference markers. It is up to you to carefully take care of the desired position and scale of your models with respect to the markers.

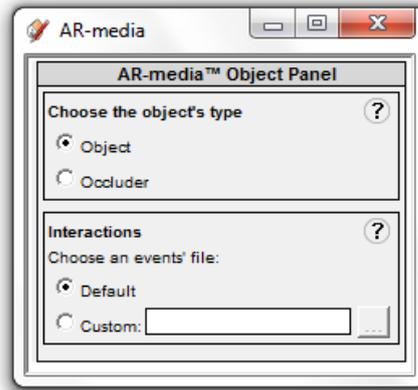
Note: When printing the markers you’d like to use in your AR experience, be sure to print them with the same size as the size you entered in the markers’ setup window, otherwise your models will appear bigger/smaller than expected.

10. Creating Objects Occluders

One of the main features of ARplugin is the possibility to create the so called “**Objects Occluders**”. In other standard Augmented Reality tools when a 3D model passes behind another object in the real world, it will always be displayed superimposed to that same object, even though this object should hide it in the observer’s view. By creating “Occluders” objects in AR-media™ Plugin you will be able to create invisible virtual objects (the so called occluders) that will be superimposed to real objects in your real-world scene thus hiding other 3D models as they pass them by in the observer view.

Creating an occluder object is easy and requires only few steps:

1. Make sure the object you want to treat as an occluder in the real scene is fixed, i.e. will not move around in the scene.
2. Model the real object as accurately as possible (you don’t need to care about textures by the way)
3. Once you have modeled one or more object occluders, you have to set-up an AR scene as described above (section 9)
4. **Select** the model you want to use as an occluder in the SketchUp workspace
5. In the Marker Configuration Window, **attach** the model to a given marker as usual
6. Select the model in the list of “**Attached Objects**”
7. Once the model has been selected, click on the “**Properties**” button and a new panel will be displayed. Here you can choose what kind of object will the model be in the augmented reality scene, i.e. a simple object or an **occluder**. Select the “**Occluder**” option to treat the model as an object occluder.



8. View your scene and eventually modify it as many times as it is required in order to check that everything looks fine in the observer's view.

Note: Preparing an Augmented Reality scene with occluder objects requires a little effort both on modeling and set-up. In order to get an excellent visualization result, it is important to

- accurately model the real object in shape and scale
- place the marker of the occluder object in the correct position with respect to the real world object

Note: Please remember that the marker of the occluder object should be always in view while moving the camera

Note: The Occluder Object feature is especially suited for augmented reality scenes that are based on a fixed camera

11. Creating your own Markers

With ARplugin Professional you can create augmented reality markers autonomously in the format `.arpattern`. You can do it by using the **ARmedia Marker Generator** utility that comes with the software. You can locate it inside the ARplugin Folder in the Programs Menu. You can also launch it directly from inside SketchUp by clicking the “Marker Creation Utility” button  in the ARplugin Toolbar (or click the ‘Create...’ button just below the markers library). To create a marker and temporarily add it to the library you can go through the following steps:

1. Launch the **ARmedia Marker Generator**. You can do it from within SketchUp™ by clicking the  button, or by locating the Marker Generation Utility in the ARplugin Folder in the Programs Menu
2. Once launched, the Marker Generation Utility interface will pop-up, asking you to fill in the details of the marker you are going to create.
3. Insert the name of the Marker in the “**Marker Name**” slot
4. Insert the path of your marker image in the “**Input Image**” slot

Note: The marker's input image must be perfectly square and must include a very small white contour. If the marker is square but doesn't include a white contour it will be not suitable for publication (see image below). A couple of empty markers' templates are available in the same folder where you can find the markers' PDFs.

Note: Images can be provided in one among jpg, jpeg, bmp, tga, png, tif, tiff formats, with RGB color model.

Note: The marker images must be files up to 1024x1024 pixels (greater resolutions might not work properly).

5. Insert the path of the output marker in the "Output" slot
6. Click on the "Create" button to create the marker
7. Once created, a window with the marker inside will pop up. If the marker has a green square around it then the custom marker is suitable for AR. If the image is not suitable, then a "No markers found." message will be prompted like in the image below



8. Click on the Marker image to generate the marker.
9. Once generated you can locate it in the path you had previously set-up. You can now add it to your augmented reality scene

Note: To make the marker generation utility work you need to have **Quicktime** installed.

12. Adding a Custom Marker to your AR Scene

To add a custom marker to your AR scene:

1. Click on the “**Setup**” button  in the ARmedia Toolbar within SketchUp™
2. Click on the “**Add...**” button under the “Available Markers” list in the Markers Library. A path selection will be prompted to select the marker
3. Once selected, a new marker with the specified name will be added to the “Available Markers” list
4. Click the “**Add**” button to add it to your scene. Once added, the marker will be listed in the “Active Markers” list

13. Exporting your AR Scene

With ARplugin Professional you can also create independent augmented reality files in the format `.armedia` that can be viewed independently with the free AR-media™ Player on any computer without Arplugin and SketchUp™ installed. To export an augmented reality scene you just need to:

1. Once an Augmented Reality Scene has been created (see for example section 9), if you have already the Main Interface window open, then just click on the “**Export**” button listed under “**Actions**”.
2. If you don’t have the Main Interface window open, then click on the “**Export**” button 

Note: Please remember that ARplugin keeps all the configuration settings in memory during the design session. This means that if you close any configuration windows its settings will be available.

3. If you want to quickly export the scene without configuring any marker, be sure that the Active Markers’ list is empty and just click on the “**Export**” button  in the Main Interface scrollbar and window. This action will force every object in your scene to be exported associated to default marker.

Exporting for iOS/Android devices

If you want to create a `.armedia` file visible on the ARPlayer for iOS/Android, be sure to have the “**View/Export for iOS/Android**” option checked in the main panel. After clicking on the “**Export**” button



you will be able to set all the custom properties of the model and then create the `.armedia` file.

Note: Please remember that when exporting for iOS and Android devices, only one marker can be used. If you have configured more than one marker, you need to explicitly start the export process by pressing the “Export” button in the relative Marker Configuration Panel. Additionally, no soundtrack will be available and no occluders and video/audio objects are supported.

14. Viewing your AR Scene

ARplugin provides users with different visualization options.

The first visualization option is “**Quick View**”. This action allows you to view all visible objects in Augmented Reality with just one click. No marker configuration is needed. Your camera will start and you will be able to view all the 3D objects in your scene on the printed “AR-media” marker (i.e. the default marker). To quick view your scene:

1. Be sure that the Active Markers’ list is empty.
2. Click on the “**Quick View**” button  in the AR-media™ Toolbar or in the **Main Interface**

The second visualization option is the “**View Configured Scene**”. This action allows you to start the Augmented Reality experience as configured in the markers’ setup interface. All VALID markers found in the Active Markers’ list will be processed and made available to visualization. You can then point the camera toward any printed version of the configured markers to view your models on their respective marker(s). To view a configured scene:

1. Be sure that at least one marker is in the Active Markers’ list, otherwise, the “**Quick View**” visualization will start.
2. Click on the “View” button  in the ARplugin toolbar or in the Main Interface.

The third visualization option is given by the possibility to open a previously generated `.armedia` files with the ARplayer. To open an `.armedia` file:

1. If you don’t have already installed it, first download and install the latest version of the AR-media™ Player from the website here:
http://www.inglobetechnologies.com/armedia_player.php
2. Double click on the `.armedia` file you want to visualize
3. Once clicked, the ARplayer will automatically open the file and the Augmented Reality experience will start.

15. Moving the License to another computer

You can move your license from a computer to another one whenever you like. You can do it by following few steps:

1. Be sure to have the full version of the ARplugin installed on every computer where you want to run it
2. Launch the **ARplugin License Manager** of the active ARplugin. You can locate it in the ARplugin Folder in the Programs Menu
3. Once launched, the ARplugin License Manager interface will pop up.
4. Input the *Username* and *Password*.
5. Click the “**Remove**” button
6. Repeat the activation procedure described in Section 3 of this Guide to activate the license on the new computer