# What is AGi32?

Comprehensive lighting **calculations**, ease of **modeling**, and fast, high-quality **rendering** for almost any interior or exterior environment, including Daylighting!

## Calculations

AGi32 is a computational program that performs numerical point-by-point calculations of incident direct or reflected light on any real surface or imaginary plane. Within this scope, it is used to predict or quantify the distribution of artificial or natural light in any environment.
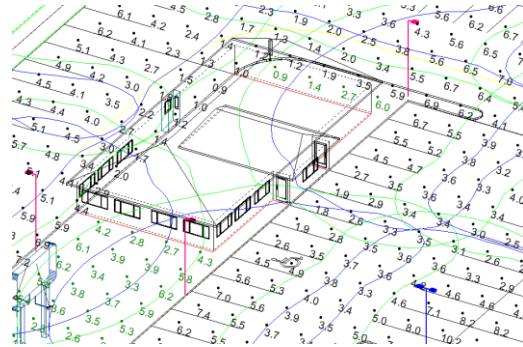


## Modeling

AGi32 is a simple yet extraordinary model builder capable of constructing almost any architectural environment. Vaults, domes, curves, slopes and extrusions are easily created, allowing you to accurately model the architectural elements you encounter every day. For those with existing 3D models, AGi32 can import 3D geometry via DWG or DXF.
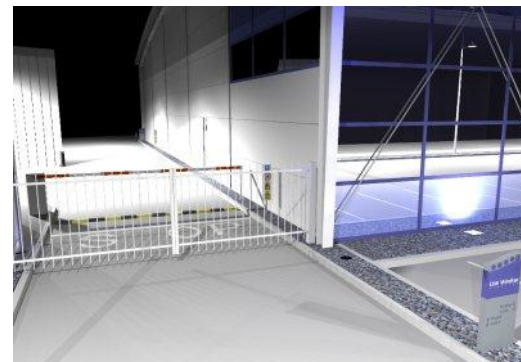


*Model created in AGi32 - wireframe*
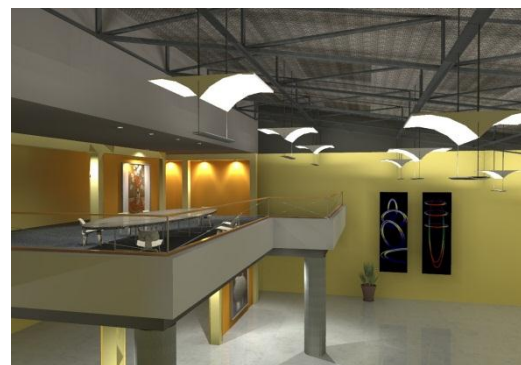


*Rendered: radiosity plus raytrace*

## Rendering

AGi32 is a wonderfully fun and interactive rendering program. Employed on this level, AGi32 can be used to generate extremely fast and photometrically accurate color images of the behavior of light within the environment. As the rendering engine is fast enough to be used on an iterative basis, designers now have the ability to quickly visualize and share different lighting scenarios before they are specified, purchased and installed.

See renderings of all sorts of applications online in our Gallery.



*David Boud, DW Windsor Lighting, United Kingdom*

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# About Calculations

AGi32 is the tool of choice when quantifying the amount of light present in any architectural application. Whether the problem be a 500-luminaire professional sports facility, large shopping mall parking area, commercial interior or single emergency luminaire in a hallway, AGi32 can produce the required numerical results quickly and accurately. AGi32 is used daily to present point-by-point illuminance, roadway pavement luminance, ceiling exitance and other specific lighting quantities for all types of lighting applications. If your position on the design team requires you to submit numeric evidence of lighting quantity and quality, AGi32 is able to produce the data you require.
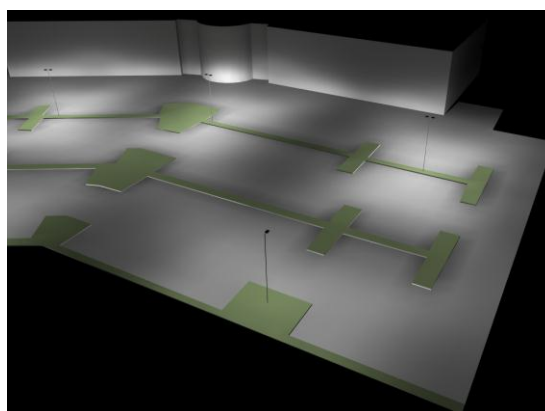
## Two Calculation Methods

AGi32 has two calculation methods to assist with the computation required in the most efficient manner. For strictly numeric results in an exterior parking, floodlighting, or roadway application, AGi32 has an extremely fast direct-component calculation engine. The Direct Only calculation method will consider the shadowing effect of objects in the scene and produce point-by-point illuminance on any surface or plane in space.

For interior or exterior projects where interreflected light is important, AGi32's Full Radiosity calculation method will compute the interaction between light and surface using its state-of-the-art Radiosity calculation engine. In this mode all surfaces can be assigned a color and reflectance and accurate luminance levels are computed for the entire environment.  An interactive light-accurate rendering is produced automatically.
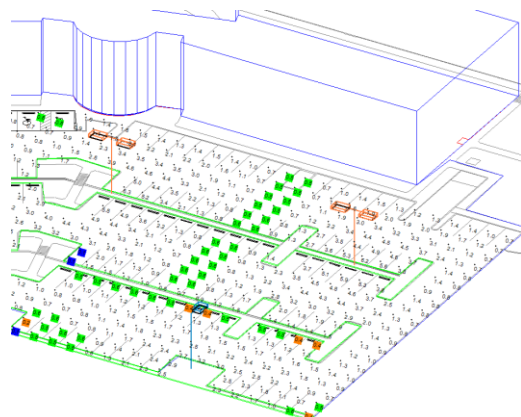


*Direct calculation method exterior with user-defined point highlighting*



*Exterior rendering generated automatically with the Full Radiosity calculation method*

## Photometric Data

AGi32 can utilize luminaire photometric data in IES, EULUMDAT (LDT) and CIBSE (CIB) formats (Illumination Engineering Society; EULUMDAT, popular in Europe; CIBSE or Chartered Institution of Building Services Engineers, primarily used in the United Kingdom). Many of the lighting industry's prominent manufacturers support the AGi32 Instabase system with regularly updated product data available with a few mouse clicks from within the software. The current list of participating manufacturers can be examined on our website.



The photometric Instabase allows users to browse through a manufacturer's database and select products of interest. A powerful Query feature is available to filter products by a variety of criteria.
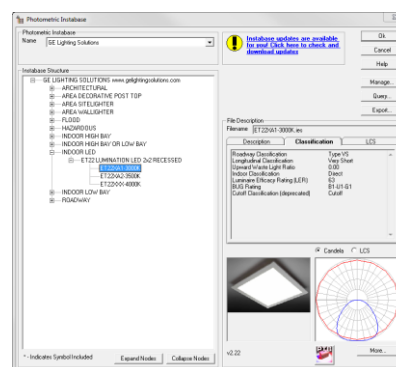
## Specific Calculations

AGi32 can perform a variety of illumination engineering calculations for your specification requirements. Which quantities you elect to compute will depend on the lighting application and/or your specific interests.

| Application | Computation possibilities |
|---|---|
| Interior | Illuminance (fc or lux)<br>    Horizontal, Vertical, Variable meter aiming<br>Luminous Exitance (lm/sq ft or lm/sq m)<br>Lighting Power Density (watts/ sq ft)<br>Unified Glare Rating<br>Luminance ($cd/m^2$) in rendered Pseudocolor |
| Exterior (general) | Illuminance (fc or lux)<br>    Horizontal, Vertical, Variable meter aiming<br>Luminous Exitance (lm/sq ft or lm/sq m) from surfaces<br>Lighting Power Density (watts/ sq ft)<br>Luminance ($cd/m^2$) in rendered Pseudocolor<br>Glare and obtrusive light quantities:<br>    Maximum intensity at a point<br>    Threshold Increment<br>Obtrusive light compliance reporting:<br>    Model Lighting Ordinance<br>    LEED v4 SSc6<br>    CIE 150<br>    AS4282 |
| Sports | Illuminance (fc or lux)<br>    Horizontal, Vertical, Variable meter aiming (TV illuminance)<br>CIE Glare Rating<br>Uniformity Gradient, Coefficient of Variance<br>Aiming diagrams |
| Roadway | Illuminance (fc or lux)<br>    Horizontal, Vertical, Variable meter aiming<br>Lighting Power Density (watts/ sq ft)<br>Pavement Luminance ($cd/m^2$) and associated quantities for IES, CIE and AS/NZ methods<br>    Veiling Luminance<br>    Threshold Increment<br>    Small Target Visibility (STV) |
| Daylighting | Illuminance (fc or lux)<br>    Horizontal, Vertical, Variable meter aiming<br>IES and CIE sky models (coming soon: Perez all-weather sky)<br>Daylight Factor (DF)<br>LEED criteria<br>Luminance ($cd/m^2$) in rendered Pseudocolor<br>Luminous Exitance (lm/sq ft or lm/sq m) from surfaces |

## Calculation Point Options

AGi32 provides a number of different options for locating calculation points. The most effective option will depend on the application and the desired calculations. All options have flexibility in meter aiming (horizontal, vertical, variable, camera)

- Automatic Placement on any surface or workplane
- 2-point or 3-point grid specification, flat or sloped
- Polygon
- Line

- Scattered
- Obtrusive light (Horizontal and Vertical planes)
- Glare Rating (sports specific)
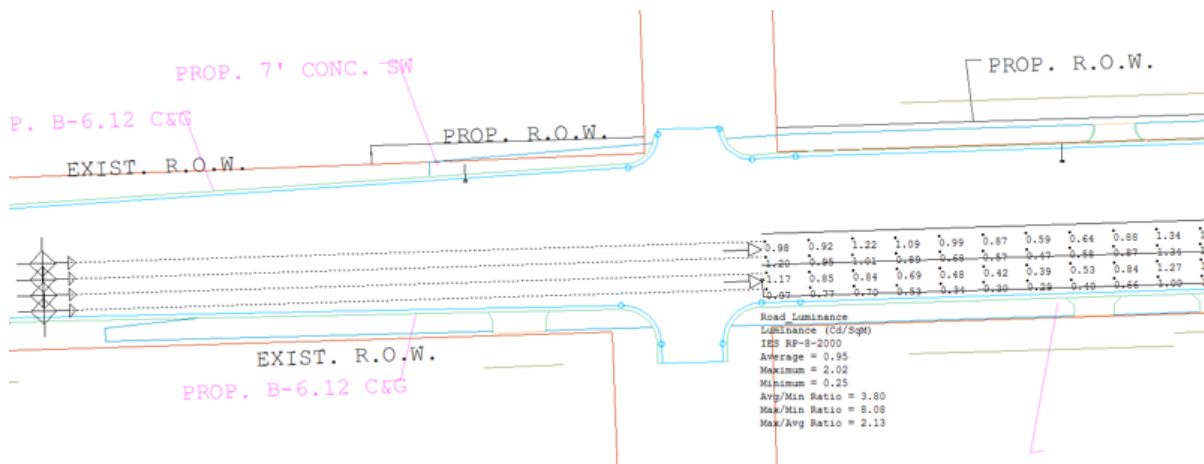- Unified Glare Rating (interior)
- Roadway criteria

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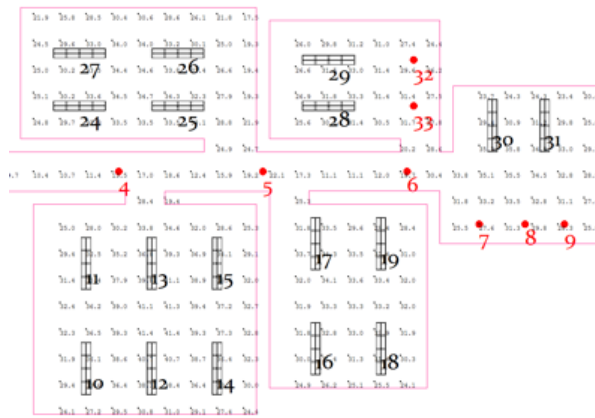
*Automatic Placement calculation points on the room floor or workplane*
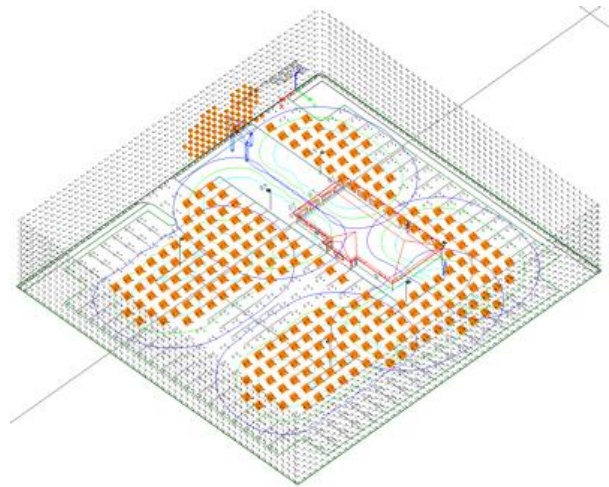


*Obtrusive Light calculation points at the property line (vertical planes)*



*Roadway specific calculations (luminance, illuminance, veiling luminance, STV and more can be switched for visibility)*

# Evaluate Your Work

AGi32 offers a dynamic and intuitive working environment wherein you can evaluate your calculated results, make changes and fine tune your projects to meet specifications.

Value highlighting is one very effective method to see a project's weak points at a glance. Monitor the overall statistics for all calculations, even those that are not currently visible from the Statistics window.
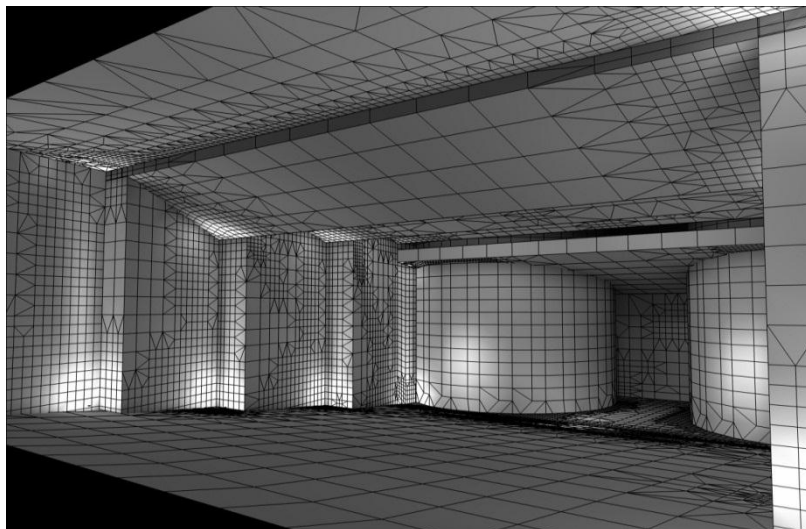




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# About modeling

AGi32 provides the tools needed to model most common architectural spaces. Using shapes like barrel vaults, cones, spheres, pyramids and vertical extrusions, you can build complex geometries directly in AGi32.



*AGi32 created architectural geometry*

However, if you already have a three-dimensional CAD model composed of surface information, it can be imported and utilized as if created internally. Surface properties such as color, reflectance, texture and surface type (glass for example) can be easily assigned during the import process.

AGi32 imports and exports DWG and DXF formats using the Autodesk RealDWG® toolkit.



*3D CAD model of Boeing 737 imported*

For simple point by point calculations with no surfaces (exterior site lighting for example), AGi32 can easily import two-dimensional CAD drawings to be used as a background reference.

## Object Libraries

AGi32 is delivered with a number of factory-provided library objects that may be used at any time to add detail, scale and realism to any lighting project.

Objects you create or import from CAD can also be added to custom libraries and organized to suit your needs.
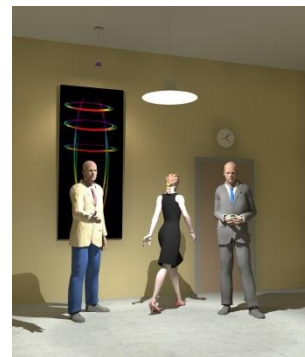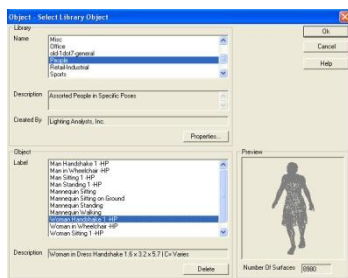




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# About Rendering

## Radiosity

AGi32's rendering engine uses the latest developments in radiosity techniques to compute the direct and interreflected components of light in your environment. Radiosity calculations can accurately model color bleed, enhancing the realism of your visualizations.

All calculations performed in Full Radiosity calculation method produce a radiosity based rendering automatically. This rendering can be viewed interactively without recalculation. Available interactive tools include Walk, Orbit, Pan, Dolly, Zoom and Clip.
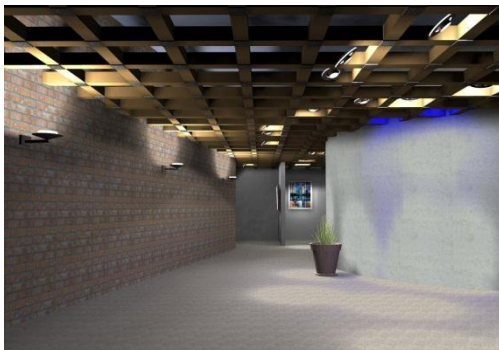


## Texture Mapping

Textures are bitmap images that may be applied to any surface in AGi32. The image can be stretched across the surface, or a repeating pattern may be applied to the surface by tiling the texture in a grid or with a static (fixed) texture size. AGi32 is provided with a textures database from which you can select a number of common architectural materials such as brick, tile, fabric, and wood. Making your own textures is also possible by carefully cropping your digital images and importing to the library.



## Pseudocolor with Scaling

Pseudocolor provides a numerically accurate color representation of the calculated environment. Each luminance or illuminance value is assigned a unique color value ranging from blue (minimum value) to red (maximum value). This allows an alternative way to view the luminance or illuminance distribution in the environment without displaying numeric values.

A scale can be assigned to the image to discern precise illuminance or luminance information. Renderings from different lighting scenarios can be compared by setting an equivalent maximum point.
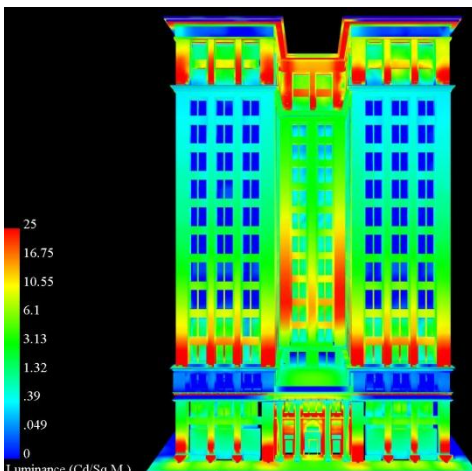


*Mike Noon, Palindrome Lighting Design*
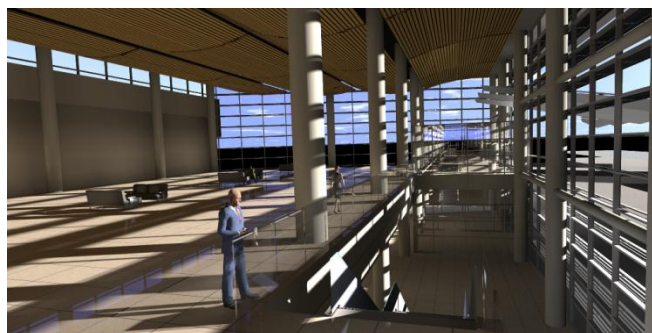
## Model Overlay

Visualization is an indispensable tool in any designer's workflow, not only for presentation, but often more importantly, for constant evaluation of results as you work. AGi32 provides the ability to overlay the rendered model with imported CAD backgrounds, text, isolines and calculated values, creating a more effective frame of reference and clarity of results.
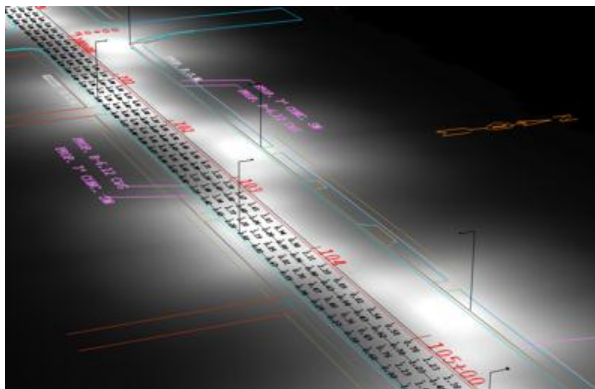


## Ray Tracing

AGi32 provides a post-radiosity process ray tracing engine to enhance any single view to approach photorealism.

Specular reflections can be rendered by assigning a specular component to appropriate surfaces. This allows materials such as glass, tile and mirror to appear realistic in a rendered view. Advanced techniques such as glossiness and soft shadows can also be applied.

Ray-tracing can be applied to any single viewpoint or batched with multiple viewpoints and be automatically saved as a JPG or BMP image.



*Paul Boken Mulvey & Banani International*

## Animation

Any AGi32 rendering can be animated by recording a series of viewpoints while using AGi32's interactive viewing commands. The animation path is then computed with adjustable walk speed and pause capability. Animations can be created with multiple scenes, frame sizes and opening and closing frames. An interactive preview function makes it easy to create successful animations. It is also possible to ray trace all frames to make a truly professional production. The end result is an AVI animation that can be viewed on any computer, independent of AGi32.
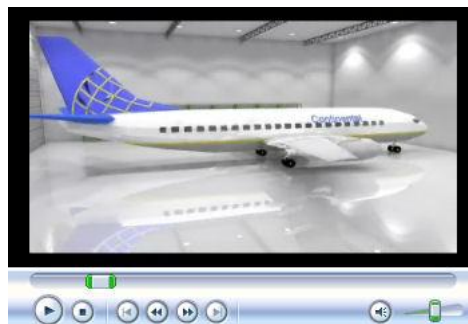


*Peer Eric Moldvar, Eclairage Techno*

# And More

## Presentation Output

AGi32 can produce output in many ways. For example: anything you see in AGi32's Model construction mode can be printed in WYSIWYG fashion, and all calculations can be exported to DWG or DXF for integration with your CAD software. Renderings can be exported to single bitmap images (JPG, BMP) or to completely interactive VRML worlds. Renderings can also be animated and saved as AVI movie files for playback independently on any computer.



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However, all of these methods aside, it is the AGi32 Page Builder function that provides the ability to produce printed or electronic output containing your choice of calculation and visualization views for a truly complete presentation.

With Page Builder you can select any media size and number of pages to hold your project presentation. Take a few minutes to create a series of master templates containing your logos and title blocks (bitmaps too) to be used anytime. Then call up a template and place your various point-by-point views, schedules, and visualizations on the various pages. You can also incorporate external files (TXT) for disclaimers, if required. When complete, either print/plot or export to PDF* or MDI. *PDF writer required.
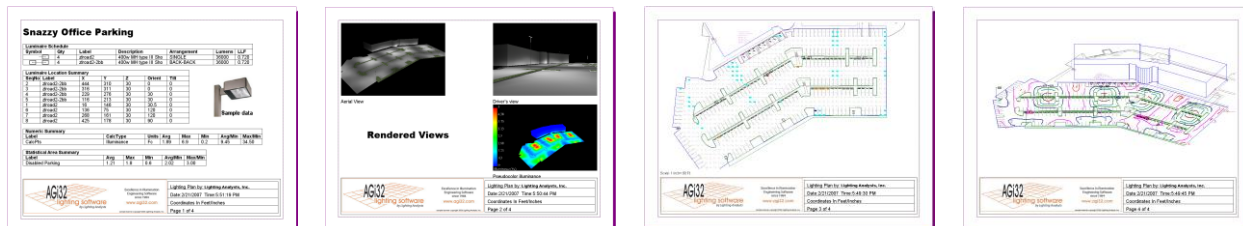


## Daylight Study Viewer

AGi32 can run complete daylight studies over multiple days and multiple hours per day in a single execution. Once a daylight study has been completed, the rendered images can be played back in sequence with selectable frame rate and multiple images per frame (e.g., RGB and Pseudocolor, or multiple RGB views of same model). A wonderful presentation tool that you can share with your customers, the Daylight Study Viewer is available for free from www.agi32.com.
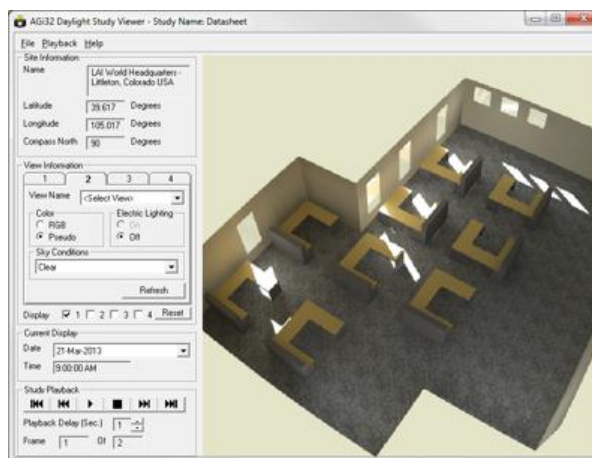


*Daylight Study Viewer*

## Try AGi32!

Download a fully functional 30-day Trial version from www.agi32.com. Get started by watching introductory video content and by walking through the step-by-step Tutorials found in the program's Help system. Questions are always welcome!

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