

also be created. For the preparation of plant layouts, and schematic diagrams for photovoltaic projects, a separate work area is available in DDS-CAD PV.

Since mid-2009, DDS has partnered with Vela Solaris in the solar energy calculation sector. The company makes the Polysun functionality available through the interface of DDS-CAD PV, thus providing a one-tool combination. The Polysun plugin by Vela Solaris provides the following main functionality: photovoltaic calculation, automatic inverter assignment, comprehensive module and inverter database (see also the description of Polysun).

2.2.10 Digital Project

Supplier, site, contact, last version, cost

Digital Project is software supplied by Gehry Technologies, which is owned by the architect Frank Gehry. Digital Project is based on CATIA V.5, which means that Gehry Technology made changes to CATIA to create a new visual interface suitable for architectural work. So, Digital Project uses CATIA as a core engine. The last version is the Digital Project V1 R4. There is no information about the price of a professional license of this last version, but the cost for an academic license is 200 USD (142 €) per year.

Functions

Digital Project products are used for 3D modeling and 3D rendering. Digital Project allows teams to design complex projects in a single 3D environment, and produce documents, such as plans, elevations, sections, detail drawings, notes, bills of materials and spreadsheets for quantity take-offs, directly from the 3D model. It is possible to add dimensions and annotations to the generated drawings.

Design stage, users

Digital Project is a high-performance modeling tool for architects, designers, engineers and contractors. Architects start to build their BIM model at EDP. So, they use this software in early design, architectural design, structural design, and modeling stage.

3D modeling

There are many modeling tools available in Digital Project. It is possible to create free-style surface modeling (NURBS), geometric modeling from wireframe, surface modeling based on solid geometry and parametric 3D surface and solids modeling [Gehry Technologies, 2009].

Rendering

Gehry Technologies offer two advanced rendering add-on products for Digital Project: Photo Studio and Photo Studio Optimizer. Photo Studio generates high-quality, photo-realistic images and movies of projects in 3D. Its ray-tracing technology provides real shadow calculation and reflection effects. Photo Studio Optimizer extends Photo Studio capabilities with 3D advanced rendering technologies such as global illumination and caustics which produce more accurate reflections and refractions. Photo Studio Optimizer improves realism with advanced material definitions [Gehry Technologies, 2009].

Coordinates

Digital Project 2D drawing is performed according to x and y axes and 3D modeling is related to x, y and z axes.

Import/export

There are many import/export options in Digital Project. General import/export formats are AutoCAD data (.dxf, .dwg), Steel Detailing Neutral Format (.sdn), Initial Graphic Exchange Standard format (.igs), HOOPS Stream Files (.hsf), Industry Foundation Classes (.ifc), and the 3D .xml Format.

Predecessor software, successor software

Since the .dwg format is universal in design and modeling, all CAD packages can be predecessor software to Digital Project. Because it supports industry-standard formats, such as .ifc, this software has a great interoperability with other applications.

BIM

In Digital Project, any information required for the project has a place in the 3D environment, from geometric definitions to installation methods. Drawings produced in Digital Project are a snapshot of the model, like a report that is automatically updated when the design changes, reducing the risk of uncoordinated design information. Digital Project introduces the concept of Dictionaries and Attributes to assign non-geometric information to the 3D model such as material finish, cost codes, resources, schedule information and more [gtwiki, 2006]. Digital Project supports .ifc, which makes communication easier with partners.

Actual solar calculation

The Solar Render Tool allows easily investigating the impacts of sunlight on the project. This tool uses the Digital Project Photo Studio work bench and rendering tools. Users have to select a view which will be rendered, run the tool and enter the appropriate information in Longitude, Latitude, Year, Month, Day, Hour and Minutes boxes. It is also possible to render scenes using the same tool. When users ask to render a scene, a new default blue spherical environment is created, and then a directional light is placed where the sun would be and a new shooting is set up [gtwiki, 2006].

2.2.11 form•Z*Supplier, site, contact, last version, cost*

form•Z is a software supplied by AutoDesSys. The last version is form•Z 6.6, which is available at the cost of 1295 USD (1056 €) for one license (Version 6.6). A demo version is also available on the official form•Z website [www.formz.com]. This demo version does not support printing, saving and exporting.

Functions

form•Z is a computer-aided design tool. Its principal functions are 3D drawing, 3D rendering and animation. The 2D drafting module is an integral part of the whole system. Even though form•Z offers drafting tools to work directly in 2D, it is also possible to extract accurate reference drawings, such as plans, elevations, sections, isometric or perspective views, from the 3D model. These drawings may be refined in the drafting module, by changing the weights and the styles of the lines, by annotating them and by dimensioning and hatching them. form•Z also features unlimited layers that can be hierarchically structured in both modeling and drafting, using imperial or metric units [Yessios et al, 2008].

Design stage, users

form•Z is a design software for architects, products designers, mechanical engineers, illustrators and animators. form•Z is thus used at design, modeling and visualization stages.

3D modeling

As well as extracting 2D drawings from the 3D model, form•Z allows 2D drawings created in the drafting module to be transported into the modeling environment to become the basis of the 3D models. Moreover, it is possible to generate primitive forms, such as cubes, spheres or cones. Users can also create 2D surfaces and 3D solids by drawing shapes such as rectangles, polygons, circles, ellipses, points, segments, arcs or vector lines. form•Z allows the creation of 3D solids from existing objects by employing different tools such as parallel extrusions, extrusions to point (convergences), revolutions, multi-path skins, etc. Users can apply Boolean operations, including union, intersection