SR 3D Builder

A LEGO® CAD tool specific for Technic models

By Sergio

Many of you at least once may have search for a CAD allowing you building virtual LEGO® models with the PC.

The most common entry point for many of you will probably be LEGO Digital Designer for its intuitive interface. Many others, due to LDD parts limitation may prefer MLCad that, even if with an old interface and graphics, it is still the preferred AFOL software. But in the last 2 years another innovative application is arising: SR 3D Builder. It mixes the fully 3D environment of LDD with the part richness of MLCad offering a com-fortable development ambient especially for SNOT and technic builders.

It will be hard to graphically describe something that it is basically 'ani-mation', but I will try. First of all, …

A short history

This is the 3rd version of the application, but is the 1st made public. It was in mid 2007 release (ver 0.1.0.15) was published on a website and soon many positive feedbacks, hints and encouragements arrived from users. In version 0.2.0.0 was added the first very basic support for hinges movements and in 0.2.2.0 the first two gears keeps working together!!

But it was in march 2009 when I published first application videos on you-tube that my application downloads exploited. From an average of 20 daily access jumped to over 60 and continue grown.

In these three years many improvements have been made to the appli-cation making it one of the most advanced in its genre.
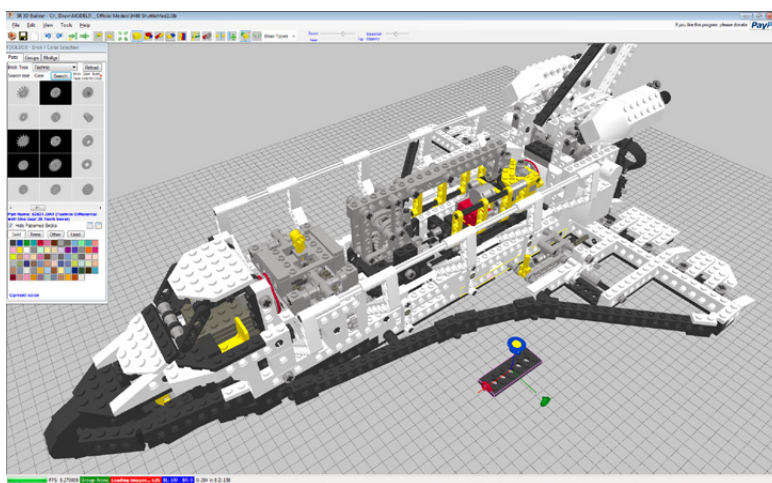
The user interface

The user interface is not so intuitive like LDD one, but after a pair of hour you will fill comfortable with it; on the other side, what it offers in func-tionality is incomparable. Anyway it is highly recommended to have a look to the manual. The image quality is good enough and the render speed is incredibly fluid even with some thousand parts models.

In the application you can find many tools helping you in model crea-tion. Starting from 'Searching the part you want to add', you can search it by type, by name or using a part type Quick Search Pane showing the most common selection. There are four way for selecting parts: one by one, connected

parts, grouped parts or by color. You can make your se-lection transparent allowing you select hidden parts.

There is a powerful mirror tool that helps you in building symmetric models: you build a side and the other is automatically built by the appli-cation that also takes care of choosing non symmetric parts. Moreover, when a part is common to both side of your model go beyond the mirror plane (like a roof top for example), the mirrored part automatically dis-appears allowing you a really quick building. Must try this!
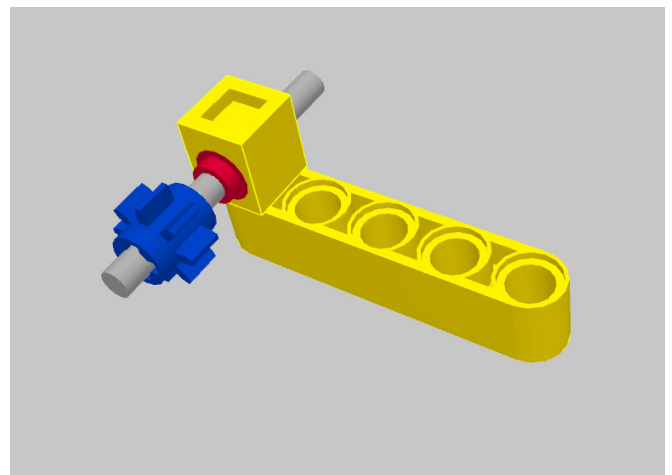
SR 3D Builder performs REAL connections between parts, so your model will be consistent like a real one. A powerful AutoOrient feature allows parts to orient and snap to correct position when an available connection is in the neighbor. So when you try to place an axle in a technic brick, it will automatically rotate in the way it can fit. The same happens with gears, pins, wheels, hinges, everything!
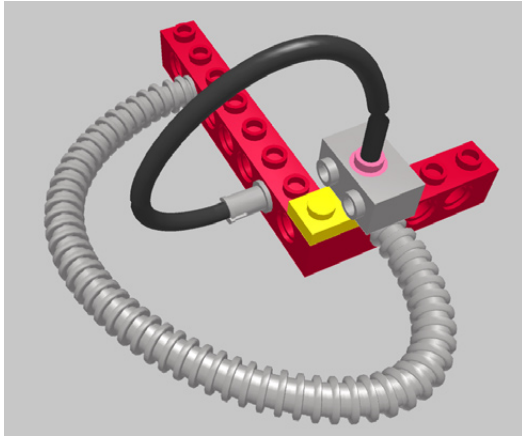
All the parts in the images result perfectly connected and assisted by the auto orient feature.

A latest addiction to the application allows realtime creation of flexible parts like hoses, tube and similar. Notice that this kind of functionality is usually offered only by some commercial (and really expensive) soft-ware!

The Tire Manager tool allows easily association between tires and wheels. A tool is available for aligning connection like the LDD Align tool, but with this you can choose the axles to rotate

parts around. The Belt Generator can be used to connect pulley or pegs or bushes. There are also tools for taking model images, creating and modifying visual instruc-tions for your model as well as creating the parts inventory used in your creations.
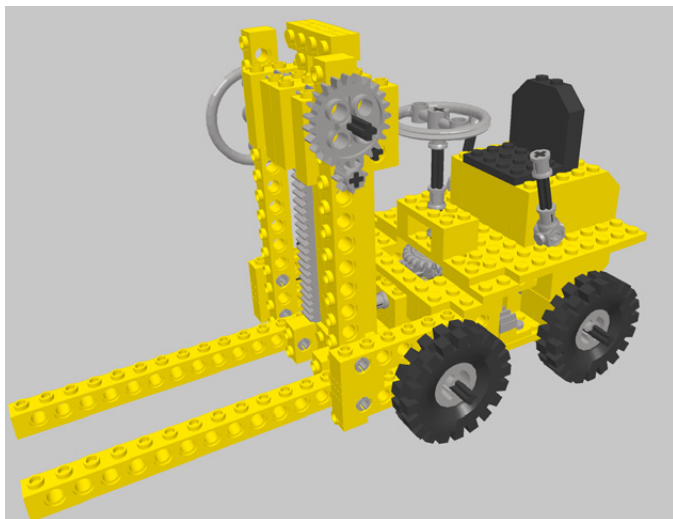
A dynamic grid assist part placement giving the user the full control of where the part will be placed. Using the grid you can change the refer-ence system of your model: if you need to work on a sloped plane, you can set the grid to reference to that plane so you will work like if you where in a horizontal plane!

Model analysis capabilities

As mentioned before, SR 3D Builder can detect commonly used connec-tions type (Mid stud connections, a back stud connection between 4 stud, and many 'special' connection like mid technic stud with antennas, studs in beams etc., are also detected and supported) and take care of them.

Hinges are natively supported so nearly any connection and movements of real LEGO® parts can be reproduced: a door can open, a wheel can ro-tate, any hinges can rotate!

But is with technic models that the application gives its best! SR 3D Builder is capable to detect not only connections, but also avail-able rotation axles, gear connection, gear to rack
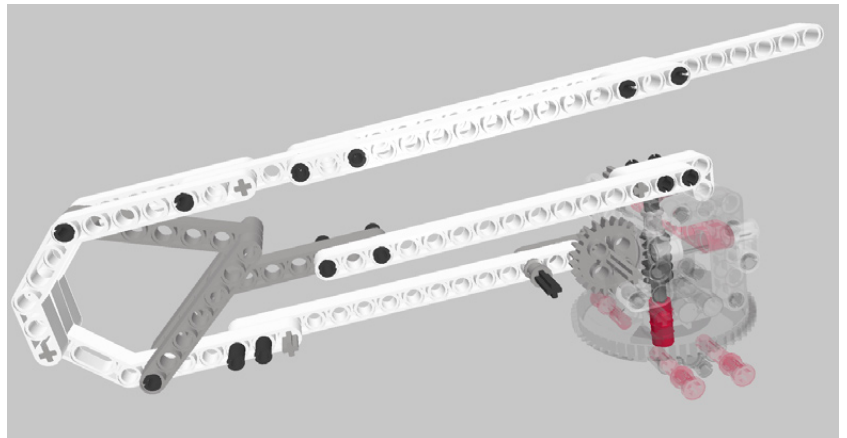

connection, universal joint, differential, kinematic, inverse kinematic and combining the effect of all those elements. The result of this is that when you rotate an axle or pull a handle, its effect is to move the model like if it was real. No needed to define parts interaction (like you need in Solidworks or other similar program), rotation axis, speeds or what else. Just build your model, switch to Animation Mode and … it will move!! And it does it in real time!! And no need to wait for processing time: SR3D can animate the LEGO official model 8840-Shuttle in the previous page image at over 30fps on nowadays entry level graphic card.

While in animation mode, you can make static parts transparent in order to display only moving parts explaining how the mechanism works.

Compatibility

SR 3D Builder uses the same MLCad parts library and also file formats are basically the same with the exception of some special features not supported by MLCad. This way part availability is subjected to lDraw (www.lDraw.org) parts releasing. Actually the part library reports near 5000 LEGO parts.

Support and Availability

First of all is important to remember that the application is still in development (as specified on official web site) so some errors may occur while playing with it. On the other side you can expect continuously new functionality and better stability Main support for problems is given from program author via email. The user manual is available in English, Holland and German, while the ap-plication itself is available in English only (no translations are planned at the moment). Over the web you can find many forums discussing about the application and an official forum is currently being activated. Also, some videos and video-lessons can be found over you tube.
The application is still in development but is substantially stable; anyway is a good practice to save your model often.
The part library is updated at any new application release.
It is distributed for FREE on its actually official site:

http://staff.polito.it/sergio.reano

Enjoy building!!
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