ConnectPress Commentary

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Companies Plan, Validate and Collaborate on 10,000+ Part Assemblies with Lightweight Solution

- *Struggling with Large Files is Over Thanks to Lightweight Solution for Assembly Planning/Validating, Tech Pubs and Visual Work Instructions*

When it comes to product design, companies can face many problems in the planning, validation and sharing of large assemblies. Whether it's with their own shop floor or with their partners in the supply chain, product design companies can run into many problems.

Some of the big problems when engaging stakeholders outside the company include protecting intellectual property, multi-CAD collaboration and interoperability, or sharing models with customers. In house-sharing has its own set of challenges, including communication problems between product designers and manufacturing engineers, use of paper drawings on the shop floor and making sure you have access to the latest version and access to CAD altogether.

These problems are exacerbated if the model sizes are large…and for companies that make heavy equipment, vehicles and machinery, the CAD model sizes can easily be in the gigabytes. For these companies, often times they cannot bring all of their sub-assemblies into a single instance as it would take too long to load and the performance would not be workable.

And finally, CAD was never meant to be a communication tool. CAD is expensive and requires a significant amount of skill and expertise to operate.

It's a sad saga that's gone on way too long. We have all of the precise 3D data but how can users effectively use it outside of the engineering department?

We have found that leading edge companies like Toyota and Tsubamex have taken a liking to solutions from Lattice Technology.

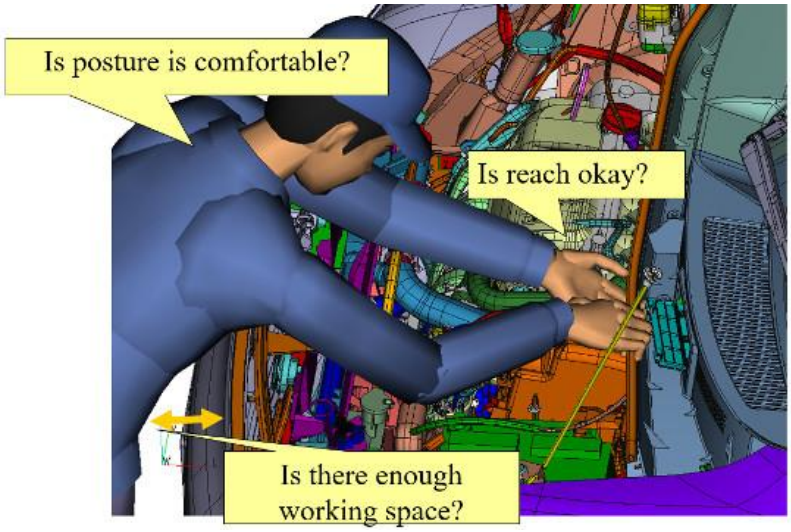


Figure 1 Validate and document manufacturing operations including human tasks

Lattice Technology started in 1997 and has offices in Tokyo, Japan and Denver, Colorado. They offer a number of solutions for sharing data and communicating work instructions, technical illustrations, assembly instructions and service procedures.

Lattice Technology solutions are built on top of XVL technology. XVL is the most lightweight 3D format in the industry that maintains CAD level accuracy, is CAD agnostic and includes the ability to author and attach related information to 3D geometry, like work instructions.

Avoid Getting Lost in Translation

Let's look at some of the formats companies are using and some of the issues associated with them.

Take neutral file formats for instance. Formats like STEP (international standard for product data exchange- ISO_10303) and IGES (Initial Graphics Exchange Specification) have been some of the common data exchange formats used in industry since the 90s. While these formats can get the job done in some cases, they have their limits. Take the STEP format that can represent most of the 3D CAD model. However it's been known to lose metadata, assembly data and design intent.

IGES files are also error prone and only provide surface data, can have import errors, holes in geometry and other troubles.

Data converters and importers can have similar issues to IGES and STEP, sometimes leading to corrupt CAD files, along with lost and inaccurate data.

On the other hand, Lattice makes the case that with the Lattice XVL data exchange format users can precisely identify changes in geometry and present them so that the user can easily see the change. On top of that, any information that has been authored and attached to the geometry remains, so work is not lost, enabling concurrency.

Another common way of sharing 3D CAD data is with the 3D PDF. 3D PDFs can display interactive 3D data, including relationships to the CAD assembly like part lists and work instructions, along with animations.

Lattice offers a 3D PDF solution that enables a person without CAD, programming or scripting experience, to easily and quickly create data rich 3D PDFs with extended data.

The Lattice Way

In short here are some of the benefits:

- Deliver interactive 3D capabilities to the shop floor or field service, reducing or eliminating the need for 2D drawings

- Giving everyone access to CAD files, even non-engineers

- Enables concurrent processes between engineering and manufacturing by enabling the use of the complete virtual model shortening time to market and reducing production costs

- Detects problems in the manufacturing validation process, and easily highlight any change to ensure that downstream documentation is properly updated

- Author and attach manufacturing assembly and service instructions to part geometry models that are interactive and may include animations

- Ubiquitous and free access to virtually anyone – using many different devices and applications including Excel spreadsheets, tablets including the Apple iPad, web browsers and 3D PDF all with interactive part geometry and associated information

Paperless on the shop floor with interactive work instructions

How it Works

Lattice technology converts your CAD data into the lightweight XVL format that can be shared throughout the enterprise and manufacturing supply chain. More importantly the compressed models maintain CAD-level accuracy and the design integrity of the original data.

The lightweight nature of XVL allows gigabyte CAD models to be worked on as a whole within the XVL environment. The primary solution revolves around being able to leverage the CAD model in its entirety for downstream needs in an easy-to-use authoring environment so that a manufacturing engineer can plan and validate the manufacturing process.

XVL supports all major CAD brands, acting as a neutral format so your data can be combined, reused, simulated, reviewed and animated with XVL viewer software. If a company is using multiple CAD formats Lattice Technology offers XVL CAD converters that combine the data into a single XVL file.

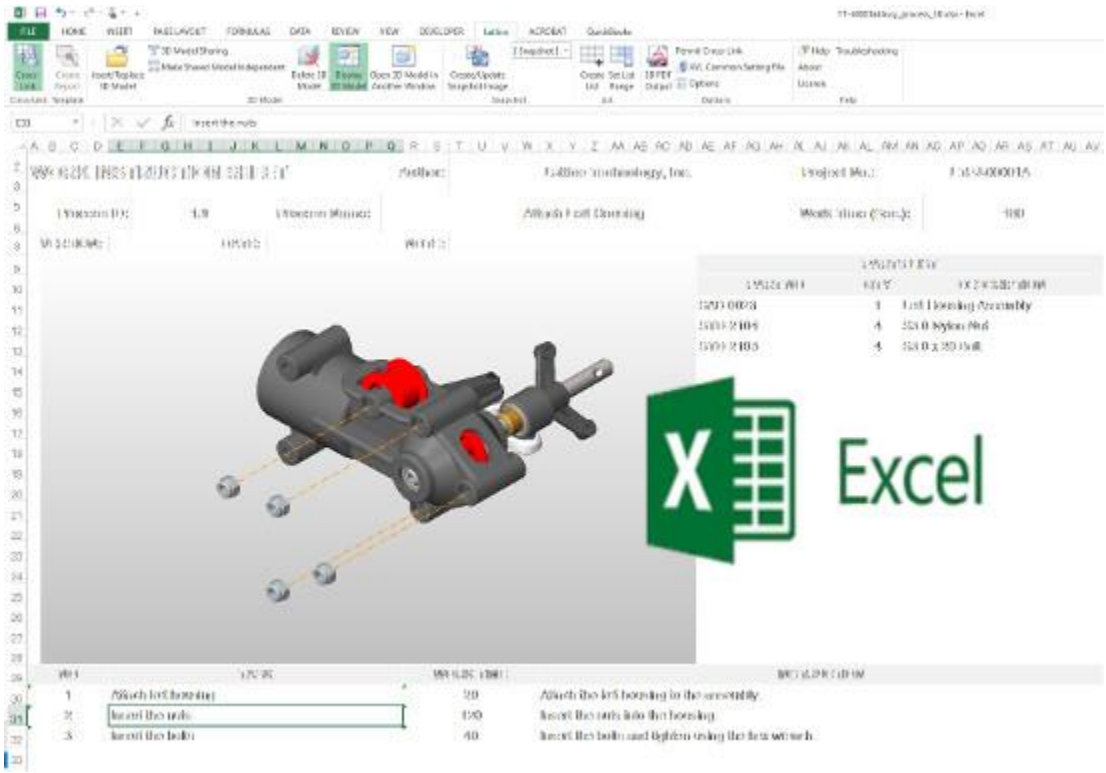
XVL Converters quickly and accurately translates the 3D data into an into an XVL format, that is compressed to usually less than 1% of its original size.

In addition, with the XVL System Toolkit you can integrate your 3D data into PLM and PDM systems.

And, it gets better, Lattice XVL can turn entire assemblies and complex models into a single compressed file. You choose how much you want to share. XVL lets the designer reduce the accuracy of the model if they'd like, protecting data integrity without sharing the proprietary information.

As mentioned earlier, not a CAD designer, no problem. Lattice XVL provides animation and viewing tools, making it easier for non-CAD users including manufacturing engineers, service technicians, etc. to review the models and provide feedback or ask questions before going to production.

XVL can be accessed by internal and external stakeholders via Microsoft Excel, interactive web pages, 3D PDF, or the XVL Player app for free.



Embed interactive work instructions in Microsoft Excel

In fact, with Lattice's XVL-based solutions, anyone can access accurate 3D models and associated data, even with lightweight devices like computing tablets.

Best of all, using XVL is easy and it improves communication between the design team and manufacturing floor, ultimately getting products to market faster.

Says who?

Don't take our word for it. Let's look at their customers including Tsubamex, L-3 Communication and Toyota and how they are improving time-to-market with Lattice Technology.

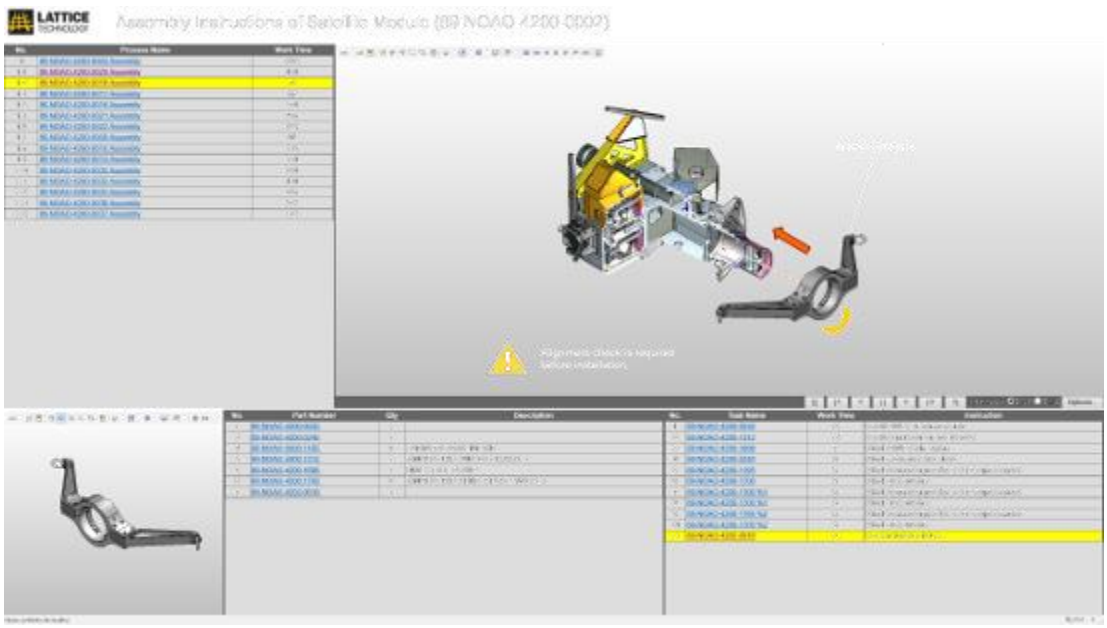
Tsubamex

Take die and mold company Tsubamex who needed to deliver their parts to their customers faster. They set a goal to increase productivity by 10 times.

One of the issues holding them back from delivering orders faster were the questions from the shop floor to the design team, because the instructions weren't clear enough. They found that accuracy of the 3D model was critical to portraying the design intent, which provided more details than a 2D drawing. Tsubamex is no stranger to adopting new technology. The company has been using CATIA 3D modeling software since 1982. In 2007 they chose XVL technology from Lattice giving the shop floor easy access to the 3D model anytime they needed it. The shop floor workers would just fire up their iPad. The software was simple, even for beginners to operate, manipulate data and ultimately make the correct decisions.

At Tsubamex after a 3D design is finished, the model data is registered and automatically translated to an ultra-lightweight 3D representation in XVL and linked with a production number. The shop floor can then easily extract necessary information for the die they are going to make by specifying that production number. They can also quickly review the 3D geometry and process attributes while on the shop floor.

To top it off shop floor workers don't need a license or the expertise to operate the CAD system.



Step-by-step work instructions with interactive 3D and parts list

Since adopting Lattice's XVL, Tsubamex has accumulated more than 10,000 models in XVL from previous projects, allowing experts on the shop floor to quickly access any of these previously designs. This helps them review dies and molds they have made in the past and identify problems they may have faced on similar parts.

Today Tsubamex primarily uses the Lattice3D Player, a free plug-in for Internet Explorer or Firefox for their users to consume the 3D model data. Tsubamex has customized the Lattice3D Player menu to provide integration with a core database, their Enterprise Information Portal, which allows them to check progress of parts, confirm parts information, and see delivery schedules.

A 3D review using XVL is now the standard on the shop floor at Tsubamex, and has completely changed how die making was accomplished in the past, getting them that much closer to reaching their initial goal.

See more about Tsubamex's experience with Lattice in this case study.

L-3 Communications

Another company facing manufacturability issues is L-3 Communications (NYSE: LLL), who manufactures surveillance systems and secure communications/intelligence products for the government.

L-3 Communications was experiencing communication problems between the manufacturing engineers and suppliers, design engineers and users in the field.One barrier delaying production was the fact the design work was being done in CAD, but the machine shop was using 2D paper drawings.

Using Lattice Technology's 3D XVL solutions the company was able to compress their Solid Edge models, making them easy to send to the production team. L-3 Communications also deployed Lattice's animation and viewing tools so manufacturing engineers with no CAD experience could quickly review the models, leading to a 20 percent reduction in rework.

Not only is Lattice Technology software crucial in-house, L-3 also uses their viewing software to share information with their suppliers.

But that's not all the technology has also been used to help military customers perform repairs in the field, using animated explosion diagrams to illustrate how assemblies were put together. With the compressed files it has been easy to communicate via L-3 Communication's customers' networks and download onto laptop computers or web pages for future reference.

See more about their use with Lattice's solutions here.

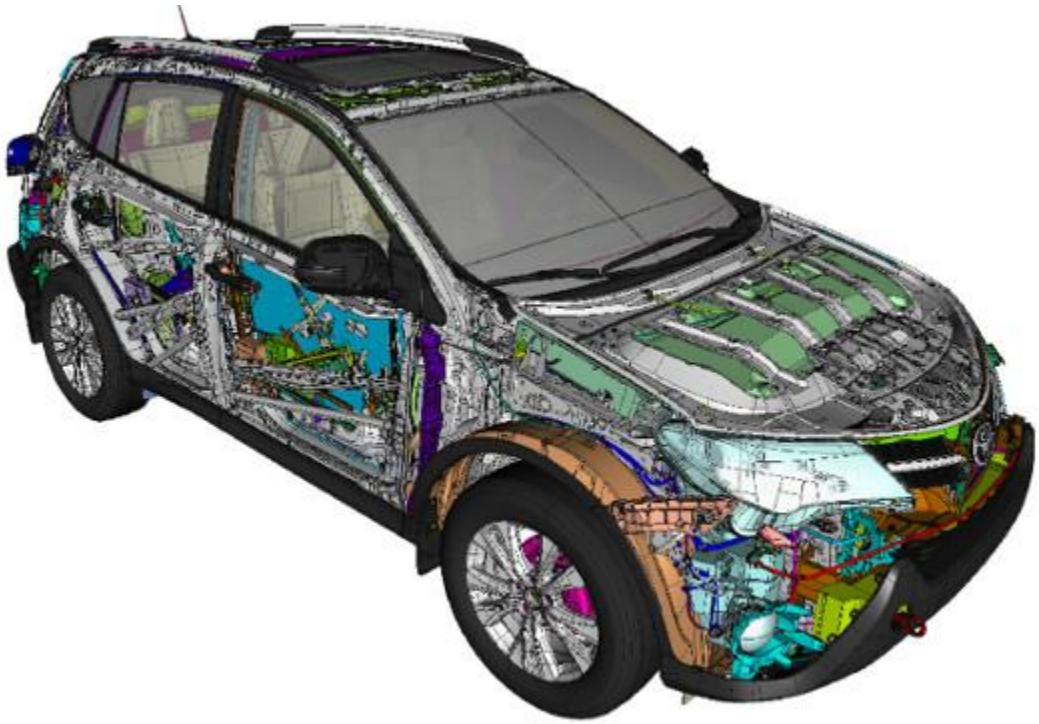
Toyota

The automotive industry is also taking advantage of Lattice Technology's solutions, such as companies like the Toyota Motor Corporation (TM).

Toyota is a world leader in the automotive industry. The company's automotive segment includes the design, manufacture, assembly and sale of passenger vehicles, minivans and commercial vehicles, such as trucks and related parts and accessories.

At Toyota's Motomachi Plant, Japan, the car manufacturer uses XVL from Lattice to engage the manufacturing stakeholders early – during the actual design process. The process uses the entire vehicle model with all parts and sub-assemblies. This is made possible because the XVL data model is less than 1% of the original CAD model, while still maintaining accuracy.

Designers at this Toyota plant can verify assembly feasibility for each component in the assembly sequences, confirm the installation of large parts such as the engine and check the work space for tools and technician posture. They can also ensure the completeness of the assembly line and capture the check results in reports.



CAD accurate, complete vehicle assembly in a single XVL instance

Toyota knew that overall quality could be increased by engaging manufacturing stakeholders in the design process--when changes are less costly and can be made more easily. By engaging the stakeholders who actually perform the assembly, they can virtually plan the assembly process during the design phase. This capability lets product designers discover modifications that can streamline and/or increase the quality of the manufacturing process. Additionally, they may gain insights that eliminate manufacturing issues or identify product design changes that will speed manufacturing or improve product quality.

For Toyota, improving the quality is a goal for the entire company, and looking at the vehicle quality from the production engineering perspective has helped to achieve this goal.

See how with Lattice's solutions Toyota has been able to achieve these goals in this on-demand webinartitled "Toyota Motor Corporation: Improves manufacturing process planning and quality using XVL from Lattice Technology."

Learn more about Lattice Technology at www.lattice3d.com.