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INTERVIEW

PAUL BROWN



AL DEAN TALKS TO PAUL BROWN, GLOBAL MARKETING DIRECTOR, DIGITAL PRODUCT DEVELOPMENT AT SIEMENS PLM SOFTWARE ABOUT THE SIXTH MAJOR RELEASE OF ITS FLAGSHIP APPLICATION, NX AND HOW IT IS BEING EMBRACED IN THE MARKET

AL DEAN: How is NX 6 being received by customers?

PAUL BROWN: If you look at the NX 5 release, the tools we put into it and the messages about Design Freedom that we put out, we made sure that the groundwork was done. This is one of the most important things for NX 6, because people can look at it and see that we're not telling them that they've got to learn something new. It's extensions of what you have already and what you've been aware of, plus there's all this extra cool stuff you can do with Synchronous Technology. We're not telling users that they've got to throw away years of experience and years of work using the system. What we're saying is 'Here's how it works, and it works how you've been using it all along.'

We've also started getting into conversations about history free mode and how users can integrate that into their workflow. There's been a lot of interest in that, particularly from people wanting to do that upfront, quick concept model, then progress a design further and quickly. What we're looking at is how you build that into the design workflow.

For example, an existing customer - one of the world's largest household appliance manufacturers - was sceptical after having seen the Synchronous Technology launch, but when we sat with them and explained that it's not a completely different approach, they did a 180 degree turn and thought it was great. Initially, the guys said, 'So what you're telling me is that I've got all these designers and they've got to think in different ways.' We said, 'No, you've got all these different tools and you can build on knowledge and expertise that they have already.'

AD: Do you think that this is going to be a theme as NX 6 rolls out? That people have to think about exactly where it fits into their workflow and processes and exactly where and when they're going to make use of it?

PB: Exactly. It's the question of how do you get this into your process, without completely disrupting it. If you're a one-seat customer and somebody comes to you and says you've got to relearn a completely new system and way of working, you're fed

up. But if you've got 200 users, then you're really up against it. It's pretty clear that it's not really a viable solution for customers. That's the initial challenge and that's what building NX 6 off of the foundations we laid in NX 5 helps us solve.

Then when people start seeing some of the power that they can have with NX 6, the other topic that comes up a lot is long-term data retention. I've had a number of sales people talking to me about customers who want to discuss this and things like Synchronous Technology are going to help out with long-term data retention. Does it mean that we're opening up and can use STEP and JT as a data storage mechanism and use Synchronous Technology as an editing tool when they need to work with that data? Now, this doesn't mean we've cracked the long-term data retention problem, but it's a step forward.

If you can get to a point where you can do all those edits and get models working the way you want, without relying on that history tree, then you've got long term data retention partly solved. And people are starting to see it as a good, solid topic. I know what triggered it for those customers is that one of our competitors has been talking about how they're deconstructing databases, which has opened up the whole issue.

AD: We talked to Giorgio Aldini at X Form over in Italy (Ed - see page v) and how he receives pretty dumb data but can now work with it and reuse components, features and the like, whereas before he was really struggling with it. There are a couple of different angles to the same issue - you've got this unintelligent data and you've now got the ability to play with it a lot more.

PB: That's the thing. You've got the ability to work with it, to play with it, to cut and paste geometry, which is something that's new and really valuable.

AD: It's a cool thing. If you look at what people use these tools for, a lot of the time it's reusing knowledge or expertise that you've used before. Now with the

scrapbook modelling tools in NX, they can grab geometry and reuse it more easily than instead of having to knife and fork it.

PB: The one thing that I will say on the subject of the drag and drop nature of Synchronous Technology is that customers are saying, 'It's all well and good dragging and dropping geometry, but now you need to show us all the tools that allow us to do things more explicitly.' They want to see all of the functions for tying down a model to precise dimensions, alignments, constraints and adding intelligence etc. The industry trend for dragging is fine, but there are practicalities that need to be understood.

Playing with the geometry is fine, but engineering is a precise activity, once I get to a certain point, I want something to be 20mm and 20mm exactly. The whole drag and drop thing is interesting and everyone tends to focus on it, but you also need to focus and lock things down.

That's what we find with customers, is that they are interested, and give the required amounts of oohs and ahhs, but they need the details. This is the real benefit of Synchronous Technology, giving the user the best of both worlds, a true hybrid modelling environment giving them total design freedom. Users just need to work out the details.

AD: How have the simulation updates gone down?

Alongside the Synchronous Technology and design freedom, this release brings a lot of new tools to the table.

PB: It's resonated hugely with our users, who have been waiting for some time, particularly the I-DEAS simulation people, who have been waiting for NX to catch up. Now, we've ticked all those boxes (and in many instances we've gone much further than the I-DEAS simulation tools) we're getting people saying, 'now you have a tool for high-end simulation'. One of the down sides we often have is an analyst or structural engineer thinking that they've got to learn the whole of NX, just to create simulation models. The good news is that with Roles, with the new Heads up UI, it's much easier to provide them with the tools they need. They now realise that they've got all the simulation tools along with some NX modelling tools that they need and they can get the job done. As a result, we're starting to see a huge buy-in in the NX user base.

AD: How does your user base and seat sales work out – are you seeing traction in specific areas or strong spots? Are they new users or users of existing technology that are looking for something more powerful?

PB: I think it's all across the board. Yes, there are the strong points for us in High-tech and aerospace. We haven't done as much in terms of advanced surfacing – but for these customers it's not as big a deal for those guys. With NX 5, there were a lot of areas for those users.

There are certainly areas such as high tech electronics, machinery and a certain amount of aerospace. Having said that, there's always bits in each release for people outside of that and there's certainly enough for everybody. The other stuff that really has triggered people to version up is the work we've done with Geolus. When you get into Geolus, you're really breaking new ground as you're forcing people to think about new concepts, to think about geometry organisation and searching. Over the years that we've had, we haven't sold a lot of Geolus, but this is going to change because it's tied into NX and Teamcenter – particularly with Teamcenter directly available inside the NX interface. Out of our business, probably, 80 or 85% of our sales are now NX plus Teamcenter.

AD: Is that people coming at it from the NX side (from a Teamcenter position) or are they taking NX and Teamcenter as a whole?

PB: Mainly they are taking it as a whole, as a combined solution.

AD: How do the license sales you're getting split up? Are they new companies and new organisations coming to

↑↑ THE REAL BENEFIT OF SYNCHRONOUS TECHNOLOGY IS GIVING THE USER THE BEST OF BOTH WORLDS, A TRUE HYBRID MODELLING ENVIRONMENT GIVING THEM TOTAL DESIGN FREEDOM. USERS JUST NEED TO WORK OUT THE DETAILS ↓↓

you or are they Unigraphics or I-deas customers moving platform? Are you breaking new ground?

PB: We are breaking new ground. The majority of our NX business comes from existing customers, both UG and I-DEAS. However, new customers to Siemens PLM are on the increase and we expect this to continue as we continue to be first to market with technologies like Synchronous Technology, Geolus and direct Teamcenter integrations.

AD: I think it's the nature of the market at present that there are not that many new CAD sites. I'm not entirely convinced that there are all these people that haven't moved to 3D. And I'm certainly not convinced the ones that haven't moved to any form of 3D are ever going to. It's going to be that hard slog that's perhaps best left to Autodesk and SolidWorks to fight out, because it's just a massive drain on resources to make the sales.

PB: There's also the situation that we've found that, for some companies, 2D is just enough. On the other hand, for 3D, NX is still being sold and revenues are still increasing. Do we see these millions of AutoCAD users flocking to move to 3D? Well not as much as we used to. The key thing is that the drive to 3D has to be more than just getting more modelling done and creating a 2D drawing from it – but that's where a lot of people are at present with SolidWorks or Inventor. However, with NX, additional licenses are still being bought by companies looking to take on new projects, developing their use of 3D further into, say CAM or CAE, or simply switching 3D software due to capability or reliability issues.

In the business that we have now, there's no such thing as a green field site. There is for Teamcenter, but there isn't on the CAD business. Everyone's got something, whether it's 2D or whether it's an old 3D CAD system. They may not have integrated CAD, CAM and/or CAE, but everyone's got something.

AD: What do you think is the biggest draw? There's the argument that there's an added layer of complexity simply by moving to 3D. But there needs to be a bigger draw, you need to be able to get some more value. What do you think this is? Is it simulation, is it machining? That's the thing that I've been trying to figure out – what drives people to make that jump?

PB: I think that it depends on the complexity of the product. I'm not convinced it's just a route to simulation for example. If you design in 2D, you're probably ignoring the simulation side towards it. I think the bigger drive is mock-up, clearance and collision detection. If I have a full 3D model that I can work with work in a 3D space, that's the bigger pay back and bigger driver. There's always the argument for using the same dataset for downstream things. CAM, I think is another one where there are enough CAM programs around that are focussed on machining from 2D to solve most people's requirements and they do a pretty damned good job. It's more about people wanting a more complete representation of their products, a more complete database of that information of their products and that's more linked to the mock up area.

MIGRATING FROM I-DEAS TO NX

SIEMENS PLM SOFTWARE RECENTLY CERTIFIED TEAM ENGINEERING FOR THE PROVISION OF I-DEAS TO NX MIGRATION, TRAINING AND UK SUPPORT. TEAM ENGINEERING SUBSEQUENTLY ESTABLISHED A DEDICATED I-DEAS TO NX MIGRATION LAB IN HITCHIN

Back in May 2001, SDRC and UGS (as it was called then) merged under the giant EDS corporation in a billion dollar deal, which created a massive engineering software giant to dwarf its competitors. SDRC's Metaphase and I-DEAS product lines merged with UGS' technologies, like the Unigraphics CAD software and I-Man products to create Unigraphics NX (now NX) and Teamcenter. Even back then at the time of announcement, the vision was to produce an integrated Unigraphics 'master series' and carry on with the planned updates to I-DEAS. This was an important commitment and very unusual to decide on a multi-year strategy of merging all the technologies to create a new product.

It's been an amazing seven years since the merger and now with the latest version of NX and its innovative Synchronous Technology (ST), the majority of the advanced I-DEAS functionality is included in NX, together with enhanced speed, a contemporary user interface and new design functionality. It appears that many firms are now opting to make the switch. The question is what's involved? Moving platforms is always a serious commitment and to date Siemens PLM Software has provided a range of tools to assist in the migration from I-DEAS to NX, geometry and data management, and these are now in their second or third revision.

TEAM ENGINEERING

TEAM Engineering was founded in 1997 and is one of the longest serving resellers for Siemens PLM Software in the UK, selling both NX, I-DEAS, and Solid Edge amongst other analysis and data management tools. The company has offices in Hitchin, (which it shares with Siemens PLM) where the company's training and support center is located, as well as Livingston in West Lothian. Recently TEAM Engineering is the first certified reseller to provide I-DEAS to NX migration, training and support in the UK.

We talked with Mark Sharples of TEAM Engineering about the migration process, "We are now at a point where everything that

you would need is now in NX. Customers can see it's a lot quicker, easier to use, better architecture and many that have seen the new Synchronous Technology, as well as the new modelling features, want to start using that functionality, especially if they work with Pro/E data and want to bring that in and work with it.

MIGRATION LAB

Staples explains that in order to successfully migrate, you need to have the capabilities to map many attributes from I-DEAS into NX. To do this, TEAM Engineering embarks on a Content Migration Manager (CMM) process which will establish the best way to transfer I-DEAS data into NX. This starts by auditing data using a number of tools which provides feedback on the kind of features that have been used in the modelling process and establishes what kind of yield can be expected when the data is brought over.

The powerful tools that TEAM Engineering use also enables them to bring across associative drawings. "If I have a drawing of a part, if I bring that I-DEAS part across to NX, (with or without full history), it will even bring across the drawing associated with it," says Staples confidently. This means that it keeps the drawing relationship with the part and even if the part is changed using Synchronous Technology, it will still update the drawing.

There are other systems which may import the 3D but risk losing the drawing associativity, which then need additional manual 2D edits in AutoCAD if the model changes. TEAM Engineering rebuilds whatever history is stored in I-DEAS into NX and checks that it's valid. Some of its customers don't always take history across, but choose to take the parts as they are and then use ST to model on them.

Clearly there are significant data management implications of moving to NX. It may be important to move legacy meta data that was stored in I-DEAS Team Data Manager (TDM) across into Teamcenter. Using the TEAM Engineering migration lab, the best strategy is defined. It may be the case that some users will chose to move to Teamcenter, opt to keep old data in I-DEAS and start a new project in NX. If there is a need to re-use data they can decide to bring that in, as and when, and use Synchronous Technology to make changes.

If a customer is in the middle of major design phase of a project it's probably not prudent to swap data management systems, which they may choose to implement when they are starting a new project. Sharples points out that audits aren't there to scare customers, but it's important to know what problems you will encounter with geometry and meta data.

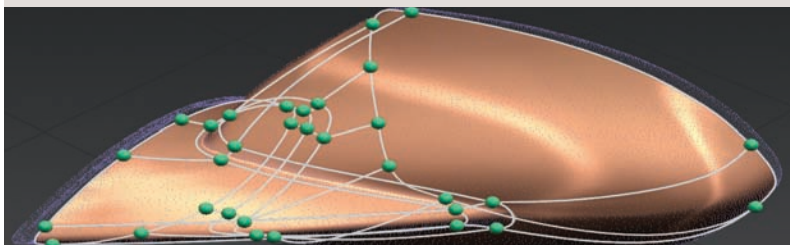
"Teamcenter won't let you have an entry without a related part number, where I-DEAS TDM would let you have something that didn't," explains sharples. "When you migrate that to Teamcenter you have to have come up with a part number. We have utilities that go and find duplicates and parts without numbers to purge all that information – but the customer has to decide how to resolve it."

Sharples sees the training as equally important. "We advise on transition training and there are tools that come with the NX product that allow you evaluate how you have modelled in I-DEAS and give you the equivalent in NX." According to TEAM Engineering, the learning curve is not as steep as it would have been with traditional packages like Pro/Engineer or Catia: NX is a lot easier to use so TEAM finds that people move quickly on this. An I-DEAS to NX course is typically run over just two days.

CONCLUSION

Migrating systems is all about coming up with a plan and as NX now seems to be really appealing to the remaining I-DEAS customers, it looks like Siemens' previous tools are mature enough to greatly ease the process. For customers on maintenance, the cross-grade is also free. TEAM Engineering has been trained up by Siemens in the US to implement and advise on the use of its migration tools in the UK. The initial audit is free, together with analysis of a few test parts to see what issues may be encountered during the process, prior to agreeing an engagement and mapping out a successful migration to NX.

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NX MARKS THE SWEET SPOT FOR XFORM

FOR INNOVATIVE DESIGNS AND PRODUCTS, ITALIAN INDUSTRIAL DESIGN POWERHOUSE XFORM USES NX AND SYNCHRONOUS TECHNOLOGY (ST). STEPHEN HOLMES TALKS TO GIORGIO ALDINI ABOUT HOW THIS NEW TECHNOLOGY FITS INTO THE DESIGN WORKFLOW

For Xform, design and engineering is treated as the same discipline, with team members working on both aspects of a product's development. This is reflected in the approach to projects, training and tools that are all refined to support this mantra. Founded in 2000, the design firm from Reggio Nell'Emilia, Italy has grown using NX as its tool of choice, now designing a multitude of products from compact pressure washers to luxurious mega yachts.

Xform founder Giorgio Aldini has seen the software evolve over the years and considers NX as key to the majority of the firm's projects. "We've used NX since the company was founded, and use it because of the process we work in – in an integrated way where engineering and industrial design is the same," he says. "Instead of different CAD programs at the start of a project, we start with 3D models with all the functional and technical data."

For Giorgio, 3D concept exploration is a key factor and the recently introduced synchronous technology (ST) is the best modelling improvement, giving designers freedom from the very first stages of the design. "When we are looking for new ideas in the first phases of modelling, we can explore different alternatives in a few clicks, by simply dragging geometry," explains Giorgio. "It doesn't matter if the product is sculpted by surfaces, the Face Finder in NX can apply modifications which respect the geometric conditions of the original model, and it's done in real time."

The ability to work without constraints is an important factor, especially with constantly shifting goal posts during the development of products; how many times do the original plans change between the original concept and final product? Giorgio answers bluntly, "Nobody can count! And when it happens you need to manage the models, often trying to force geometry

changes which fight against the creation history."

"ST is the idea that you can build history on demand," he continues. "When you import models from other CAD systems, or want to erase histories of features in your model you are able to modify the existing geometry that you want, still using features, but not worrying about history."

"There are many situations where you can use this. At the beginning of a project, when you are looking for new shapes and ideas, you generate global changes and modifications to the geometry – the model continues to follow your requirements in real time."

This proves especially useful when working for large companies keen to make the most of their design archives. Xform continues to work with some of the biggest automotive suppliers in Europe, seeing their work emerge on car bodywork and accessories, where clients are keen to work with existing components to reduce rework. The reuse of data is important in the large-scale production of gardening and power tools, another industry in which Xform is active. The concept of part standardisation and reuse emerges as a constant issue for industrial designers, and one that NX6's synchronous technology breezes through with new ease.

Giorgio is happy to explain that working with NX6 provides the team with easy access to a project's history. He says, "When you start a new project in a large production industry not one product starts from scratch – you build from the bottom up – they want to reuse so many components. They give you PDM archives for components, but they are without history."

"In creating the product model, you create a geometry of support and links that help you model, but when you start a new project your customer picks clean files [without history] from their archive, so when you need to reuse geometry, or modify the parts, it's key that your tool must be able to manage, and ST does this very quickly: You can change anything."

"This is a very common situation for people working on very long projects; you can find parts that are very well modelled, but the 'history' is so long, and going up and down this takes a long time. Also the model is completely different from what you might want when using it in a different context, so you want to be free and start from scratch. ST lets you work with or without the story at the same level."

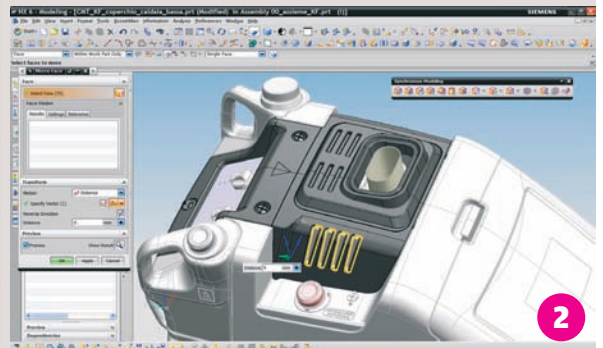
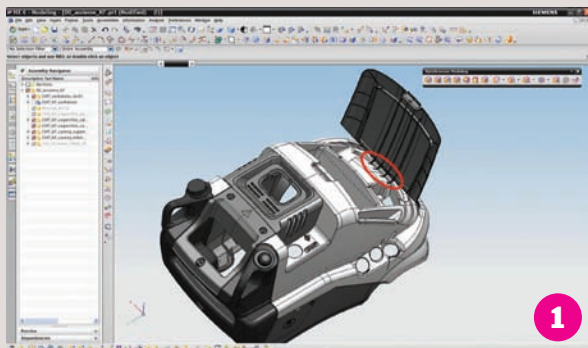
"With it we can modify just the region we need, bypassing the history. Moreover, we'll be sure that nothing else will be touched. It also allows you to reuse geometry in a different context from which it was originally modelled. ST lets you cut out a portion of a part and reuse it in a completely different situation."

At Xform NX is used entirely, from concept design through to production, so as a tool it has to have an accessible user interface, a factor that NX6 has greatly improved, having been modelled on the input of customers like Giorgio and his team. The team at Xform has seen a clear 'roadmap' for evolving versions and improvements that all add up to help designers like themselves.

So where would they like to see the next improvements being made? "Future improvements for me would include integration with PDM and the shift on the horizon towards polygonal modelling," says Giorgio, expressing his support for further use of the 'forgotten form' of geometry modelling. Yet, as far as freedoms go, the latest version of NX gives Giorgio and his team the ability to work to their mantra as engineers within design.

1 With ST the team at Xform is able to modify only the region they need, bypassing the history. Moreover Xform can be sure that no other component will be touched

2 ST enables Xform to cut out a portion of a part and reuse in a completely different situation



SHOWER POWER THROUGH NX

THE ADOPTION OF NX HAS ENABLED UK SHOWER MANUFACTURER, AQUALISA TO RETAIN AND GROW ITS TECHNOLOGICAL LEAD. THE ABILITY TO QUICKLY EXPLORE A RANGE OF DESIGN IDEAS HAS FUELLED THE COMPANY'S CONTINUED INNOVATION

With a turnover of more than £40 million and 300 employees, Aqualisa has come a long way since 1977 when it was founded to develop the bi-metallic thermostatic shower valve. In May 2001, Aqualisa was the first UK company to launch a digital shower (Quartz Digital) with ease of installation, one-touch controls and consistent temperatures. It produced a second award-winning digital product line (Axis Digital) featuring dual switches in 2004 and followed up in 2006 with a line of wireless and battery-less remotes that can be positioned outside the bathroom.

Aqualisa specialises in domestic showers. As part of its long-term strategy the company is constantly developing new concepts to suit different sectors of the market, from the workaday installer to the boutique style developer. Aqualisa was, for example, the first company to provide an easy-to-install exposed digital shower in which water flows inside the riser rail.

"In the world of showers we're quite cutting edge," says Glenn Porter, engineering project manager at Aqualisa. "We are the world's leading manufacturer of digital showers, and we were the first shower manufacturer to have a truly digital shower in the market."

The biggest business challenge for Aqualisa is time to market. "We are always incredibly busy yet we manage to do things that other companies do not," asserts Porter.

NO LOSS OF LEGACY DATA

Aqualisa has been using 3D CAD since the mid 1990s. By 2004 it was clear that a major upgrade was needed. "We looked into simpler and cheaper packages," says Tracey Nertney, senior design engineer. "It was important to us that we could bring over legacy data, so our main criteria was compatibility. The NX digital product development solution from the Siemens PLM Software gave us the option of transferring all our history."

Aqualisa bought nine seats of NX from the Siemens PLM

Software reseller, Team Engineering. The company also purchased 12 seats of Teamcenter, which it uses to manage product data. "The support we received was excellent," says Porter. "Having people who know our situation is reassuring," adds Nertney.

NX has become the software of choice for each new project. By the end of 2007 the last product designed on the old system was complete and Aqualisa was ready to bring over ten years worth of CAD data from different systems.

SUPPORTING CREATIVITY

"We found that NX was easy to learn and easy to use, which means that we all got up to speed quickly," says Nertney. "There is often discussion about which system is easier but all our users agree that NX is the best. It is more stable and more intuitive. And the ease of use cuts the time it takes to design. It is twice as quick to create a drawing, for example, especially with detailed views. This used to be a two-stage process. Now it is done in one click."

The design team is finding that assemblies are also quicker and easier to create in NX. "I am working on a front end at the moment," comments Porter. "It has taken 30 to 40 hours so far. It would have taken 50 to 60 before. We can quickly explode an assembly to see all parts and automatically label them for bills of material. It's so easy; we just press a button to produce a balloon."

The ilux range, which took two years to develop, was the first full line to be produced using NX. According to Porter, it would have taken four months longer on the old system. "We did not just develop a controller, we also designed two handsets and spouts with complex curves," he says. The installer-focused Opto Digital line was produced in a record-breaking nine months – a task that would have taken a year previously.

"The increased speed of modelling means we can pursue more ideas in the same amount of time so we can select from a broader spectrum of ideas," Porter adds. "Our next product will





Visage Digital shower with concealed control detail shot. The simple on touch on/off button can easily be seen as can the LED, which flashes to indicate water is still warming up; turning to steady when it has reached the user's pre-selected temperature

be better because of the flexibility NX allows, and we hope that the resulting product offering will help grow our market share still further."

The first few products designed in NX have set high standards. Of two controllers released in September 2007, one won CORGI Product of the Year. The other is ilux Digital, a top-of-the-line shower and bath controller with the highest degree of sophistication yet achieved.

OPTIMISING EXISTING DATA

One benefit for Aqualisa's designers is that NX allows them to bring data over from the various packages they were using before. Much of the data is compatible with NX and so can be fully integrated into a new design. Even when data is not fully compatible it can still be read, and with direct modelling extension (DMX) functionality, it can be modified as well.

"DMX allows us to take dumb data and do things like resize holes and move walls," Porter explains. "This is especially useful when we want to reuse components or remodel them." Aqualisa works with external industrial designers who focus on the appearance of a product and may utilize another specialist system. DMX modeling enables Aqualisa's team to accept a design with complex surfacing and take the data forward.

Nertney is pleased with the extra capability that the design team finds in NX. "It is really helpful to have the NX strength wizard,"

he notes. "We would have had to purchase this functionality as an extra within our previous system. The NX rendering module is also very useful. NX also has an integral surfacing package, which was an add-on with our previous software. We are looking to work quickly and creatively, leading the market as we go. NX provides just what we need."

⇧⇧ **DMX (DIRECT MODELLING EXTENSION) ALLOWS US TO TAKE DUMB DATA AND DO THINGS LIKE RESIZE HOLES AND MOVE WALLS. THIS IS ESPECIALLY USEFUL WHEN WE WANT TO REUSE COMPONENTS OR REMODEL THEM** ⇩⇩

GLENN PORTER, ENGINEERING PROJECT MANAGER, AQUALISA

NX 6

REVIEW

ALONGSIDE THE LAUNCH OF SYNCHRONOUS TECHNOLOGY EARLIER THIS YEAR SIEMENS PLM SOFTWARE UPDATED ITS FLAGSHIP PRODUCT DEVELOPMENT APPLICATION. AL DEAN TAKES A CLOSER LOOK AT WHAT'S NEW IN THE LEGEND THAT IS NX

» NX6

» Siemens PLM software

Price on application

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1 There's been a huge amount of work done adding intelligence to the NX mould design tools. Mould cavities are now linked back to CAD data, meaning design changes can be propagated to mould quickly and automatically. If you're working with multi-cavity moulds, there are tools to reduce the upfront work, so that mould cavities are laid out with sketches, then the actual part geometry swapped out when needed

In the June Edition of DEVELOP3D Magazine there was a huge splash on the release of Synchronous Technology within Siemens PLM's Solid Edge products, but as many will be aware, Edge is not the only 3D product modelling system within Siemens' product portfolio – there's also the mighty NX. Our task this month is to look at the latest release of NX, how sync tech is being implemented within the higher-end application set and what else is new.

When stripped back to the bare basics Synchronous Technology is all about allowing you to work with geometry in a history free model that retains feature information and allows you to work with your part's form on the fly – with no recalculation required. On top of this, you have the ability to define relationships between geometric features, dimensions and other parameters without having to have the expert knowledge of how a part or assembly has been constructed. The first thing to note is that within the context of NX, Synchronous Technology is being implemented as Design Freedom, confusing I know, but the thought behind it does stack up as in comparison to Solid Edge the way the technology has been built into NX differs greatly, so let's explore that.

ST IN NX BASICS

ST in the NX environment doesn't split your working practices. The last few releases (NX 5 in particular) have seen more and more direct editing tools built into NX, with the system more

capable of consuming this new technology and making it usable with the existing tools. Essentially, the difference is that you can flip between History and History-free mode on the fly, within a part, done so you can either keep a trail of everything in serial sequence or not without changing the actual work done. What's key is that you have a much more dynamic way of creating, editing and interacting with geometry. This last point is something that's also seen a huge ongoing focus for NX – user interaction: so let's look at where the system is at for this release.

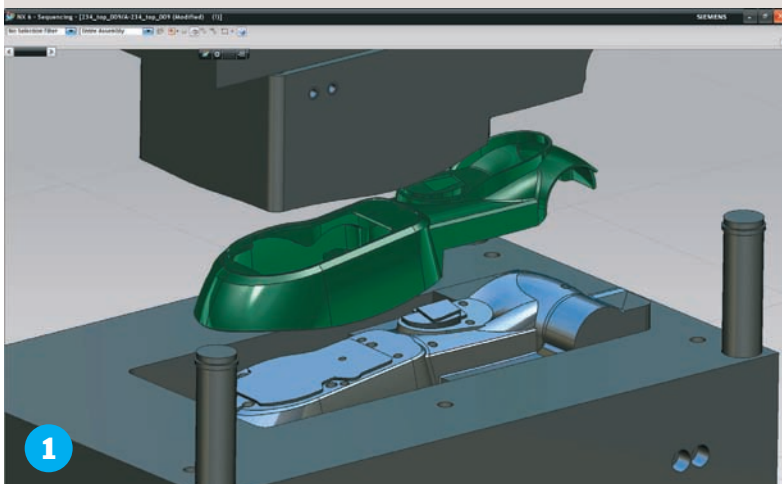
Geometry is directly manipulated and features recognised, such as holes, blends, chamfers, and shelling. The point is that these features (with the exception of shells) are not stored in a traditional feature History tree. As you edit, the system uses a new tool called Active Selection to find common geometry, meaning edits to multiple features can be made in a single operation.

This allows for the editing of features such as holes en masse, but with some intelligence, so that only features within your field of work are edited, rather than making a change and finding you've edited a small hole on the other side of a large part by accident.

One thing that does appear in the feature tree is a shell. This enables you to maintain wall thickness when working with the ST-based editing tools, allowing you to take additional geometry, paste it into your part, then use the shell face to create and maintain the uniform thickness – your selection is the face that is integral to the part.

This cutting and pasting of geometry is something that's highly impressive and is referred to as 'scrapbook modelling'. Whereas in other systems you might be able to use basic forms of cut/copy/paste, the flexibility and lack of dependence on history with ST makes this really usable. Geometric features can be cut and pasted within parts or between parts, so features that need to match, where interfaces lie, can be created very quickly and they remain intelligent, so relationships are moved and copied as well. This type of thing is very subtle, but how often do you find that you are recreating the same type of geometry in different parts or even within the same part and there's no real way of reusing that data on the fly. With this you can.

This is really the crux of ST within NX. The system has never been as reliant on History-based modelling processes as other systems, so the development team has been able to integrate this new feature-based but History-less way of modelling into



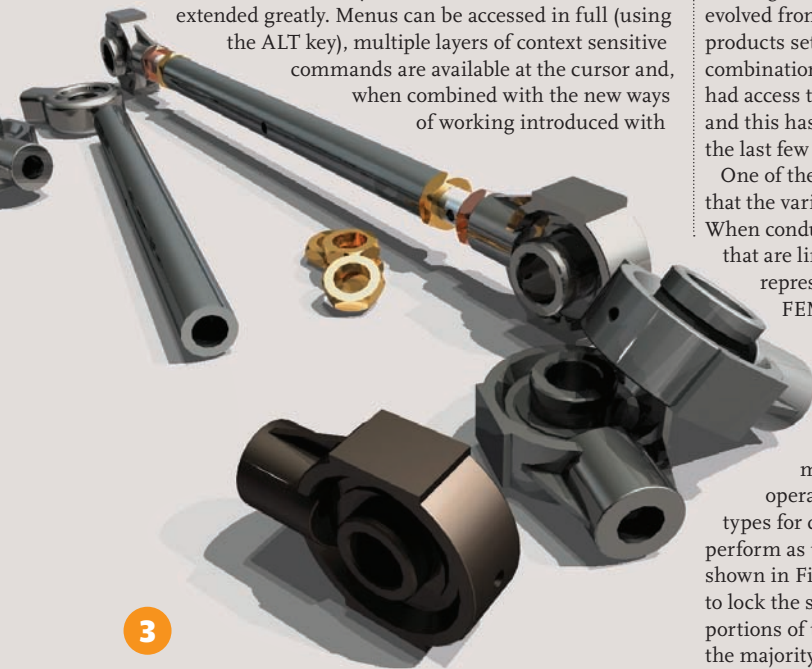
the very core of the system. Essentially, you can work with geometry to create the forms your need in terms of parts and assemblies, then start to add the dimensions, constraints and other relationships to the geometry to bring higher levels of intelligence. In the NX environment, this intelligence is built into your product models using DesignLogic and Expressions tools. These are a step beyond simple geometry parameters and add real design intent and knowledge to your model.

Starting with a basic form, then using the various tools (dimensioning and constraints) to tidy it up, it creates a finalised model that conforms exactly to your requirements, but with the ability to make edits just as you would earlier.

USER INTERACTION

The last few releases have seen the NX UI advance at a phenomenal rate in terms of usability. While that's a general term, what I mean in this instance is two things. Firstly, the underlying architecture of commands and operations were completely rewritten in the last release, so many working methods and practices are now common and shared between commands. As a result learning times are cut (as knowledge of one command gives you an immediate head start with ones with which you are less familiar). Taking this further, the presentation of commands was reworked to provide you with a very clean interface. The majority of commands are driven from the same rail-based dialog, which only shows itself when needed. This in itself is a high productivity booster, but when combined with work done to make the modelling process much more engaging and based on the 3D model rather than the dialog, this means that working with the system is much more intuitive.

This release extends the use of 'on model' working further in several areas. Firstly, the radial toolbars have been extended greatly. Menus can be accessed in full (using the ALT key), multiple layers of context sensitive commands are available at the cursor and, when combined with the new ways of working introduced with



ST (DESIGN FREEDOM) WORKFLOW



1 Choose a part from existing geometry, such as a sheet or solid body, and copy "Ctrl C" to Clip Board



2 Geometry is simply pasted "Ctrl V" into another part, sheet or solid body, from the Clip Board



3 The item is then modified to suit requirements. In this case the hole has been removed



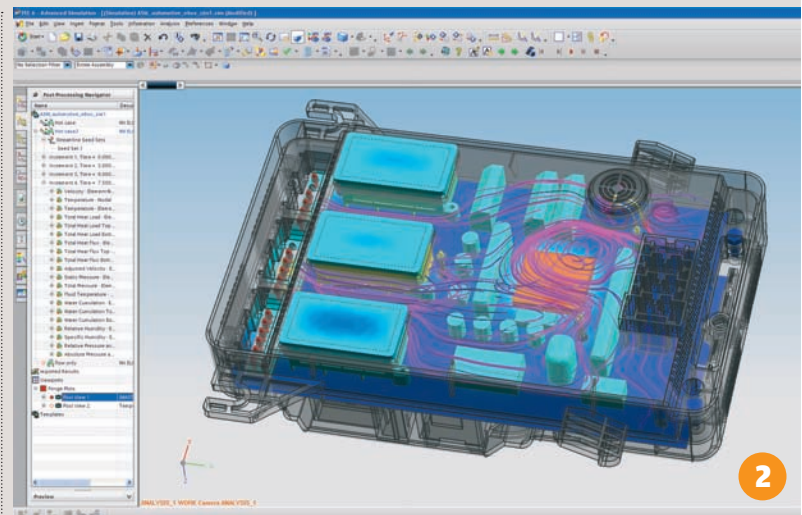
4 This can then be dynamically positioned ready for inclusion into part. Notice that it is positioned off the part



5 Synchronous Modelling "Paste Face" used to add the copied geometry. Notice the powerful way in which the geometry adapts to its new context and reblends



6 Very quickly geometry has been copied from one part, modified for use and included in a new one



Sync Tech, then you have an extremely intuitive system.

There have also been a couple of updates that I think most users are going to love. Firstly, you can now switch into Full Screen mode, which, with the rail-based toolbars and new at-cursor menus, gives you a huge working area. Alongside this the new TrueShade mode displays your geometry with realistic materials, shadows, a range of preset lighting conditions and reflective floors, all without the need for high-end graphics.

SIMULATION

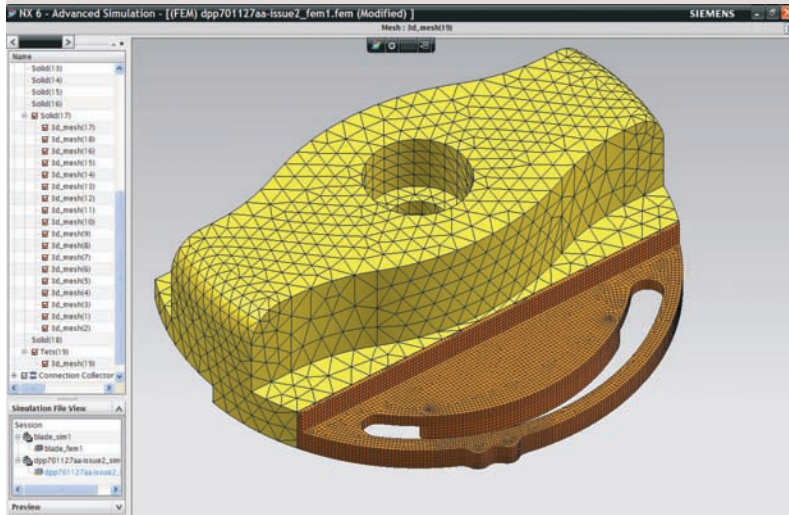
Alongside the UI updates and the introduction of Sync Tech, perhaps the biggest area of concentration most likely to excite existing users is simulation. For those unaware, NX has evolved from the amalgamation of the Unigraphics and I-deas products sets, alongside Siemens' release of NX Nastran. The combination of the three means that Siemens' development has had access to some of the world's leading simulation technology and this has been integrated into NX pretty consistently over the last few years.

One of the core underlying updates to simulation is the way that the various components have been restructured for reuse. When conducting simulation tasks you now create three files that are linked back to the originating data. The SIM file represents the loading and boundary conditions, the FEM file contains all of the work you do to clean up the model such as abstraction, where features are removed or suppressed for simulation purposes, while the POST file is where you store everything in terms of result extraction and visualisation.

This means that sections of the process are much more reusable. In addition, the new Glue Contact operation allows you to mix and match different mesh types for different sections of a single part, so that parts perform as they would, using intelligent choices. The example shown in Figure 2 is a toggle switch which uses deformation to lock the switch into certain positions. Now, while some portions of the component undergo large-scale deformations, the majority do not, so why run the whole thing as a non-

2 The new NX Electronic Systems Cooling package can now simulate condensation and dust/particle impact as well as the couple flow/thermal characteristics of an enclosed electronics system

3 The integration of Geolus technology within the core of NX 6 means that part standardisation becomes more efficient, as you can search for existing components that may suit your application, or can provide basic starting points for new design work



The new meshing tools within NX 6 allow you to mix and match mesh types. Here, a standard mesh is used for the central component of the button, but the portion of the design which undergoes non-linear behaviour (through deformation) is meshed to allow it to be simulated correctly

linear (and inherently more complex) simulation. These new tools allow you to set-up the component (with materials and loading conditions), but sub-divide the component into those that undergo linear and non-linear deformation. The job runs as a whole and with ease, but you're conducting what would traditionally be a very complex multi-physics simulation.

The simulation of sheet metal parts is something that many users are probably interested in, considering its increase in popularity these days, but as with many such things the actual process of simulating thin wall thickness parts isn't quite as easy as it could be. This area has some attention for this release with the introduction of mid-plane modelling tools to assist in making it easier. Mid-plane modelling is a commonly used method of constructing thin walled FEA models. Instead of defining the complex geometry, a thickness value is assigned to the elements when meshing. Problems arise with complex geometry where the mid-plane is not readily apparent and gaps occur.

NX 6 introduces tools that allows the user to re-stitch, match and merge edges, creating a cohesive form that can be meshed. Some of the tools aren't associative but the tools get you most of the way there, assuming massive topology changes aren't made, only a swift clean up.

PRODUCT TEMPLATE STUDIO

There have been two areas of work that allow for design to be formalised and enables more re-use in a controlled manner. The Product Template Studio allows for the publication of a part's parameters that drive its design, typically authored with Knowledge Fusion, in a very usable format using standard templates. Taking the parameters, geometry and expressions that control part of the selected part, you can then add an interface for those reusing that data. This can contain links to CAD entities (so highlights are shown on the model) and all manner of supplementary information. This can then be stored within the part file, so it is available in the assembly modelling

mode and you can start to build intelligent template driven assemblies that combine all knowledge of how that product is built up.

CLOSING THOUGHTS

To be honest, we've barely scratched the surface of NX 6. What we've done is look at the updates which resonated most. What should be clear is that NX is continuing on a very aggressive development schedule that has continued over the last couple of years. The NX 5 release saw building blocks introduced (in terms of Direct Editing) which now make so much more sense in the context of the Synchronous Technology release. What we have now is a system that is very interesting in terms of modelling approaches.

For me, the introduction of Synchronous Technology within NX is much more exciting than Solid Edge. The reason for that is that NX has always allowed you to work with a much wider selection of modelling methods and has always supported the ability to intelligently link your part geometry to your design intent at a very granular level. This release sees this heightened. Everything seems to be working in a much more connected manner. From the outset of the design process, the updates with Geolus technology mean that you can reduce your design overheads by making it easy to find components that can be reused as is, or adapted to a new purpose. The new Sync Tech based modelling tools then give the ability to model in a much more flexible and free manner, alongside the traditional parametric tools, as well as the surface-based modelling tools that have been a mainstay of NX for years. Then there's also Simulation, which is really impressive.

With the NX Nastran solver as the foundation technology, Siemens is doing a great job of allowing you to take advantage of some pretty advanced simulation tools right at the design stage of the process and doing so in a manner that most users can take advantage of.

Next up there's production and manufacturing. NX has always had a rock solid reputation in machining and mould design circles, purely because it's one of the rare systems that has combined advanced CAM functionality with supremely capable modelling tools adapted for mould and die design.

NX doesn't seem to get much in the way of coverage these days, but when you sit down, take it all in and look at what's been accomplished over the last few years, it's clear that if you're looking to adopt a product development and manufacturing system that really can cover everything from conceptualisation, right through to production and beyond, then NX is a serious contender. The introduction of Synchronous Technology means that the pain associated with learning a new design system is eased somewhat and that should certainly drive new adoption. Those evaluating 3D tools are often scared off NX because of its sheer size. However, when stripped back to its ability to intelligently create a 3D model of a product in development and capture everything that relates to that process, then it's amongst the best systems currently available. When you realise that you have the ability to work in a single environment to take a product to market, then it becomes even more compelling.

INTEGRATED 3D SEARCH WITH GEOLUS

One of the most impressive, but seemingly small updates which I doubt gets much airplay is the integration of Geolus technology within the core of NX 6. For those unaware of it, Geolus is a 3D shape search technology that Siemens PLM acquired some time ago. The core concept is that 3D shapes can be distilled into a series of vectors that describe a part's form and geometry. Working on that basis, you can then use a number of tools that allow you to search for components that match specific search criteria.

Now, that's sounds somewhat

cryptic doesn't it, but think of it this way: When you're designing a component then you're typically going to have a rough idea of what that component is going to look like. So, before you start designing in anger, you sketch out a rough shape of its form, then use the Geolus search tools (which are integrated directly into the interface) to find components that are similar, both in terms of the usual search strings such as part number, classification (if you're using Teamcenter), but also to find parts which match in terms of geometry.

Now, this gives you a couple of benefits. Firstly, if you're looking for standard components, then this will bring them up and you can see if those parts can serve the purpose you're looking for, maybe with some adaptation of parts around it. This also reduces part count and inventory as you're using existing parts which have a traceable history, and are pre-approved and perhaps signed-off. In addition, you may find similar parts, but with some quick redesign, these can be adapted to the purpose - meaning that although you'll have a new part

number and the usual approvals in place (if that's how you work) you're working on existing data and reducing actual design time. When combined with the ease of adapting existing geometry that the introduction of Sync Tech brings, then you should see that the time and effort savings this combination represents is huge.

Finally, it also works with non-NX data too, so JT, IGES, STEP as well as data from other systems such as Catia and SolidWorks can be included in the searches, so you can also find supplier design components.

TOOLROOM TECHNOLOGY (TTL)

IT'S NOT OFTEN THAT A MACHINING SPECIALIST JUMPS INTO RESELLING MANUFACTURING TECHNOLOGY, BUT WHEN THEY HAVE DECADES OF PRODUCTION EXPERIENCE AT THE CUTTING EDGE OF MANUFACTURING, THEN YOU SIT UP AND TAKE NOTICE.

AL DEAN REPORTS

Toolroom Technology Limited or TTL as they are known to those in the know, are a name familiar to many that operate in the machining world. Based in Haddenham, Oxfordshire the company has built a reputation amongst the elite in the machine world for providing a high level of expertise across many facets of the metal cutting world. Much of TTL's experience revolves around the concept of "Adaptive Machining" so let's explore that a little further, then look at how this ties into its new relationship with Siemens PLM.

Adaptive Machining has been developed at TTL to solve some key issues that are found in the aviation, power generation and marine industries and they relate to variable geometry. When such products are in service, it's very common for the form of the components to change with time as they undergo the extreme loading and working conditions they typically operate within. As a result, the 'in use' components can be different from the ideal CAD geometry from which they were initially manufactured, if geometry was even used in their development. This can cause serious issues when maintenance and repair is made, as you can't machine according to the nominal CAD data because of these differences. What adaptive machining does, is solve the problem by providing a closed feedback loop where the parts are reverse engineered, then the tool-paths are adapted to

the physical form of the part, rather than the ideal geometry.

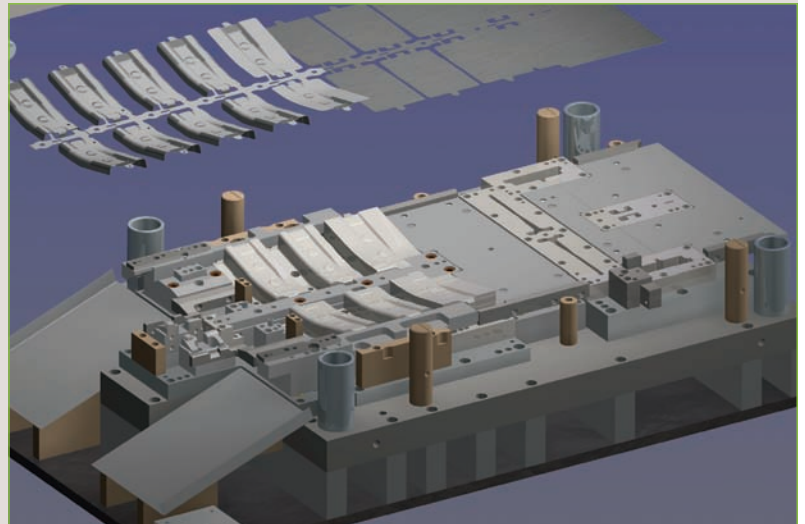
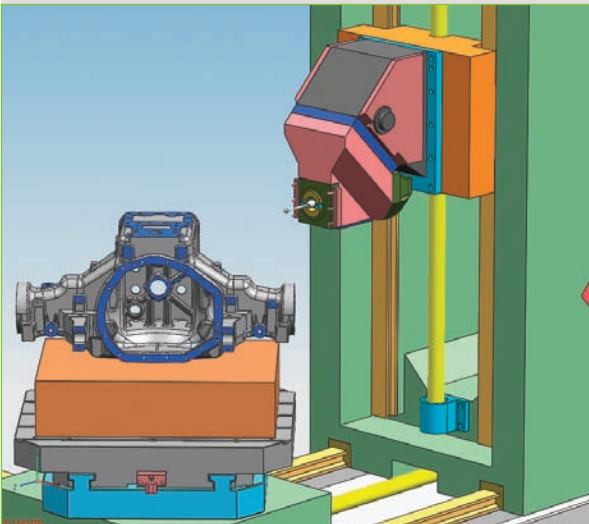
Not surprisingly, TTL has mastered the creation of these closed loop systems, in a fully automated production environment. In terms of the benefits to an organisation working with these types of problems, it's clear that there are significant costs savings to be made. An example quoted by TTL shows that within the Gas Turbine industries typical cost savings for repair or manufacture of any given part can be in excess of 50%. This is achieved by the creation of an intelligent system which adapts to the form of a part and provides significant reductions in not only cycle time to affect repairs, but also to remove many of the non-conformance and labour costs by eliminating handwork and human error. To create such systems, TTL has become a master of a couple of different core technologies, which when combined, provide its customers with a pretty much bespoke system for fulfilling this kind of work.

One is the ability to machine complex surfaces, whether that's a turbine blade, or to recreate the precise form of components for pharmaceutical processing machinery. To support this, it's pretty clear that you need a solid understanding of complex machining in true simultaneous five axis.

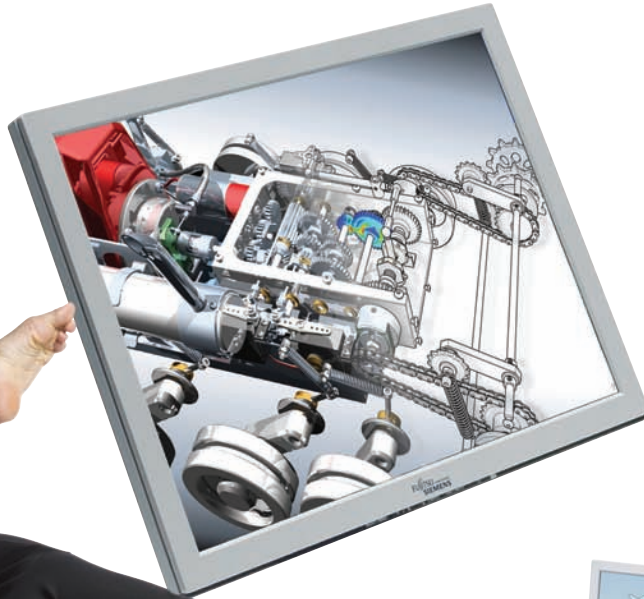
The other core technology and expertise at TTL is in the field of Reverse Engineering. When you're working with variable geometry, then the ability to capture the actual form of the components you're working on is essential. Over the years, TTL has built up a comprehensive knowledge of the reverse engineering world and uses the hardware and subsequent software that allows you to adapt toolpaths to accommodate the variation in a part's form, using a variety of contact and non-contact devices. Of course, while mastery of disparate technologies is one thing, the real experience and knowledge at TTL is held in the ability to mix these two technologies together, along with fixturing and software development, to ensure that the system under development can do the job.

So, how does this relate to Siemens PLM software? The answer is that TTL has just signed up as a technology partner for Siemens PLM. The background to the deal, from speaking to the team in Thame, is that they are constantly looking to improve what they do and ensure that the platform technologies they use can provide the tools they need, both now and in the future. With this in mind, TTL has engaged with Siemens to adopt NX as its platform of choice for both geometry handling and machining. Alongside this, the company has signed up to become a reseller for Siemens PLM solutions, including NX and Teamcenter. With TTL's expertise in production proven machining and the handling of complex geometry for the machining world, it looks like it's a relationship that not only provides TTL with the core platform they need to continue their work in the adaptive machining world, but also one that has the potential to provide users with a sound source of advice and expertise when looking to adopt Siemens' tools for production.

www.ttl-solutions.com



GREATER POWERS NX 6



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Strength NX 6 handles complex problems. It can reduce design time by 15% and physical prototypes by 30%, while improving machine tool utilisation by 15%.

Coordination NX 6 can deliver a 20% faster product development cycle time through its process efficiency – accelerating time to market.

Productivity NX 6 works using YOUR current process. This can help you to halve training time and increase productivity by 20%.

Confidence Better views and processes make better products. NX 6 makes that happen, through world-class solutions from Siemens PLM Software.

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