

# 3D PLANT DESIGN: INTERGRAPH'S TWO-PRODUCT STRATEGY AND WHY SMALLER PROJECTS STILL DESERVE QUALITY TOOLS FOR QUALITY DELIVERABLES

In the following article Rick Allen, President, Intergraph CADWorx & Analysis Solutions; Dominik Hepp, Product Manager, CADWorx Plant Design Suite; and Venkat Raman, Business Development Director, ImageGrafix, Middle East & India, are interviewed by Vornel Walker, Vice President - Product Marketing, Intergraph CADWorx & Analysis Solutions.

**Vornel:** People often ask, "Why does Intergraph develop and offer both Smart 3D and CADWorx to the plant design community." Could either of you clarify the reasoning here?

**Allen:** Thanks Vornel, I'll take that one. Smart 3D and CADWorx have the capabilities that make both of them suitable for a wide range of projects and applications, although each have their strengths and niches.

Smart 3D excels at delivering very complex, or megaprojects projects with perhaps multiple design centers regionally or globally. Often these projects last a long time and require major investments in resources and manpower.

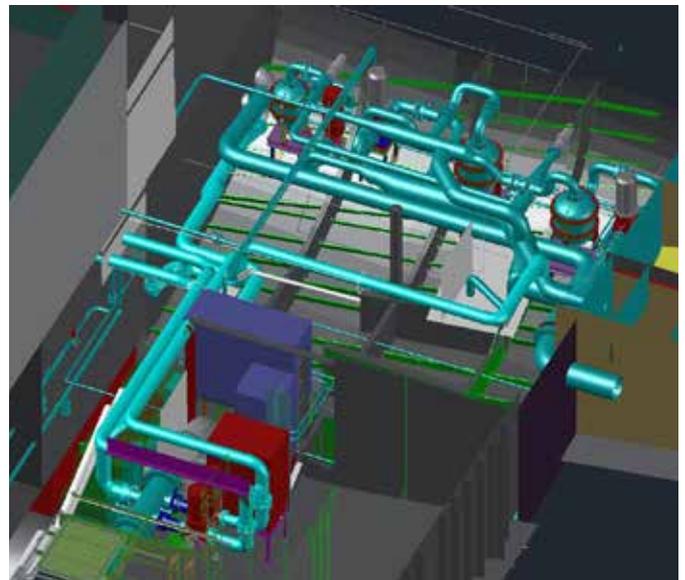
For CADWorx, its sweet spot is in the small to medium project range, but it can also effectively handle larger projects, but certainly not at the scale that can be undertaken by Smart 3D. As an example, one of our clients, Richard Design Services (RDS) (<http://www.richardig.com/rds/>), recently completed a USD 360 million renewable diesel facility in Norco, Louisiana – actually the largest renewable diesel facility in the United States. The project consisted of 450 pieces of equipment, 200,000 feet of pipe ranging from 1½ to 24 inches in diameter. The project also required a very fast-track 12-month engineering timetable with a 22-month overall schedule.

The ability for CADWorx to deliver fast implementation capabilities and project turnarounds for small, medium and some larger projects has been a major key for its success.

**Hepp:** Also, it is worth remembering that some smaller projects are often part of larger megaprojects. CADWorx not only handles these projects really well, it also integrates with Smart 3D as part of the enterprise solution. This provides best-in-industry design practices and efficiencies.

**Vornel:** We have just heard a global perspective, could you share what things look like in the Middle East and India?

**Venkat:** For the vast majority of the design sites in our region CADWorx is a perfect fit. India in particular is seeing fantastic growth and you see mega projects taking place to support that growth. However, there are also many facilities that are in desperate need of performance modifications, as well as maintenance and repair work.



*Image Courtesy: Harris Pye Engineering, Dubai.*

These clients still demand quality deliverables – irrespective of the size of the project. The main point is that if a plant, offshore platform or ship, is being modified, revamped or repaired it needs to be back in service as soon as possible. That means that any fabrication or installation should take place as smoothly as possible.

**Vornel:** Makes a lot of sense. Rick, let me go back to something you just said about small and large projects. Are you saying that CADWorx suits smaller firms and it has no place in larger EPCs?

**Allen:** Absolutely not! For larger engineering companies and facility owners, who choose Smart 3D as their enterprise solution, CADWorx certainly has a place. Many of these companies have smaller or fast turnaround projects and the need for ongoing maintenance, repairs, facility operations and plant updates.

We have many such users that like CADWorx because of its full intelligence, automation and full integration with analysis solutions and Smart 3D. In addition, its ease of use ensures fast turnarounds for virtually any type of job or project. The market recognizes the value offered by both CADWorx and for SmartPlant, which is why each has been so successful.

**Vornel: What are the organizational benefits for companies having or running both solutions?**

**Allen:** Automating can lower a firm's ongoing administrative and operational investments. CADWorx has helped many engineering firms succeed, especially on fast-track projects, and these firms have gained new clients as a direct result. However, a smaller fast turnaround project still requires a quality clash-free model from which automatic deliverables can be generated. CADWorx does this for them.

**Hepp:** These smaller projects can also be part of a larger enterprise endeavor, so interoperability and the ability to feed existing enterprise systems is still required. This bidirectional exchange of information CADWorx provides with Smart 3D offers a truly integrated enterprise-wide design solution. The Richard Design Services design project for the Norco diesel facility is a good example. With CADWorx, they were able to cut 100,000 project hours off design and engineering – a significant one-third reduction in time. Also, the project is part of a larger facility. Because it was done with CADWorx, it can be easily integrated into the Smart 3D enterprise management system.

**Vornel: You know that readers out there are trying to get a sense of what constitutes a small or large job, and what part of total plant expenditure the CADWorx market represents. Can any of you shed some light on that?**

**Hepp:** Yes Vornel, I think that I can. There is certainly an overlap between Smart3D and CADWorx in the addressable market. But what is interesting is that in a conversation with OOs we were told that 90 per cent of the projects they award a below USD 10 million! We estimate that these smaller projects represent around 50 per cent of the total engineering capital expenditure. As I said before, most of these projects are still being done without intelligent tools and without automation.

This is where CADWorx could offer major benefits if implemented. We have customers who use CADWorx on job in the USD 100's thousand and still these jobs are cost effective and profitable. CADWorx is the solution for 90 per cent of the projects out there, and even clients that award these projects deserve quality deliverables.

**Venkat:** One of our users, UAE based MUC Oil & Gas Engineering Consultancy, who conduct projects related to the design of new tank farm areas and their modifications, accurately illustrates what Dominik is saying. Their Managing Director, **Eng. Mohammad Shahin** shared that "CADWorx is an ideal solution for the work that we do, and because it is AutoCAD-based, we are able to use our existing resources our team was able to produce deliverables from day one."

**Vornel: With both products providing 3D plant design, what is the difference? Is it project size?**

**Allen:** The difference between the two is not project size alone because a project's cost is typically determined by the equipment costs which can represent 60 per cent of a typical project. Overall complexity is more of the issue. Smart 3D provides rich rules-based processes, so the company knows that Smart 3D with rules established can maintain design standards where there are many people involved and where the work is spread over many countries. CADWorx doesn't require rules even though it allows for that option. That is actually a major advantage

for CADWorx for many types of projects where fast implementation and turnaround are required. With CADWorx the designer activates the design checking processes to make sure design standards are maintained. CADWorx is also an AutoCAD-based 3D plant design solution, which is a significant advantage.

**Vornel: That makes a lot of sense. As we finish up here I'd like to go back to CADWorx and get a clearer idea of the sort of projects are you both see in this "sweet spot?" where the majority of OO projects are awarded?**

**Allen:** With oil prices at all-time lows, we are seeing a keener focus on making sure that what is already working is doing so as efficiently and effectively as possible. This means that many projects are more likely to be brownfield projects, and therefore smaller in scale – a perfect fit for CADWorx. That said there is still the same client pressures of excellence, quality, timeliness and cost required on these projects. Limited scope is no longer an excuse for poor deliverables, and MRO (maintenance, repair and operation) projects have an extremely negative effect on profitability if they do not go as planned.

**Vornel: Can you give some examples of the negative impact of MRO and brownfield projects not going online as planned?**

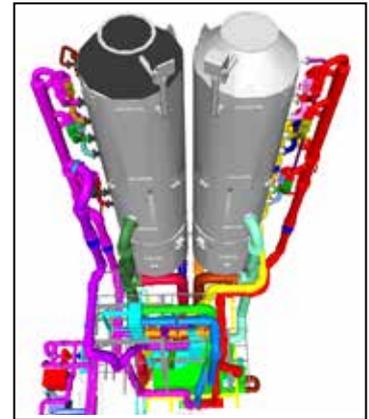
**Allen:** I can, but it may be better for me to quote from an article that appeared on [www.fuelfix.com](http://www.fuelfix.com) where Ed Winston, Principal Engineer for turnarounds and maintenance at Dallas-based HollyFrontier refining and petrochemical company said, "A turnaround is, by definition, a loss of profitability. In refining, if you're not running you're losing money." So it follows that one of the best ways to make sure that a turnaround is done as quickly as possible is to make sure that whatever is being installed goes in right, first time.

**Venkat:** You know Vornel, Rick makes a good point, accurate designs, that take into full account the boundary conditions that exist on the site, are vital if accurate installations and on-time startups are the goal. Companies should look at costs not as it relates to the design or even fabrication of a revamp, but on the cost of lost production and revenues if startup dates are not met.

**Vornel: So are you all saying that the accuracy that CAD offers is the answer to the problem?**

**Hepp:** Well not quite. There are no shortages of CAD systems, or even plant design systems, but very few of them adequately address the capture of site information with the flexibility that allows information capture to, not only be accurate, but also cost effective, depending on the magnitude of the work being undertaken.

**Venkat:** To follow on from what Dominik has just said, if for instance you are just replacing a single line you could use a combination of CADWorx Plant Professional



*Image Courtesy: Harris Pye Engineering, Dubai.*

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and CADWorx fieldPipe in conjunction with a Leica Total Station. That setup will not only allow a single user to quickly and accurately capture the installation information of that line, but also simultaneously model the line and automatically create the fabrication deliverables. The beauty is that it can be done without the operator even leaving the site!

**Vornel: Dominik, in mentioning flexibility, you seem to allude to scalability of these solutions. How can Plant Professional and CADWorx fieldPipe help address as-built project larger than those mentioned by Venkat?**

**Hepp:** The great thing about CADWorx Plant Professional and CADWorx fieldPipe is that they also combine well to work with previously captured pointcloud data. Which, as you can imagine, is ideal for the creation of deliverables sourced from the capture of tens to thousands of piping, equipment or steel components.

**Allen:** Many companies around the world are making use of the flexibility that CADWorx Plant Professional and CADWorx fieldPipe offers. At this year's Hexagon Conference, HxGN LIVE Hong Kong, we will be featuring the success story of Setch Design, a company based in Queensland, Australia, that focuses on as-built design and brownfield remodeling.

One project that comes to mind was for the installation of a new Jameson Cell (floatation tank) into the existing zinc concentration process for a mineral extraction facility – and if you have ever seen one you'd know how confined and tightly packed they are. Setch was responsible for the site survey, as-built and conceptual studies and all of the process fabrication deliverables.

**Vornel: So in this case, and projects like this in general, what tangible results can clients of these engineering firms realistically expect to see?**

**Hepp:** In this case, the outcome was that Setch was able to produce high quality deliverables that exceeded the client's, MMG's, expectations. Because designs were turned around quickly, it enabled concurrent design review, off-site fabrication and on-site construction to take place. They were also able to precisely locate complex plant, equipment & piping into a brownfield environment without any field fit or rework. In addition, the client had the installation delivered under budget and ahead of schedule.

**Venkat:** We are finding the same in our region. I have a story that I would like to share, but I'll read it directly in the words of **Mr. Vitaliy Alekseenko**, Design Manager at Harris Pye Engineering, Dubai. He says: "Because most of our projects are retrofits, on existing marine vessels or offshore platforms, we have found the flexibility offered by CADWorx Plant Professional to be ideal for our detail design and 3D modelling. Our speciality is using 3D scanners to conduct on-board surveys to capture as-built data of equipment, structural, piping components. This capturing of information now takes hours, instead of days, when compared to manual methods."

Mr. Alekseenko goes on to say, "CADWorx fieldPipe is then used to convert scanned data into an intelligent 3D CADWorx model that can be manipulated and reviewed with the client to establish what best fits their budget and needs. Ultimately, installing the updated piping in the virtual model saves our clients a considerable amount of time and money and allows the evaluation of an infinite number of virtual options before settling on the right design.

"When done we know we have a clash-free design that can produce automated fabrication deliverables such as isometrics and bills of materials that install right first time. This ensures that clients experience minimal downtime and keeps ships operational and productive for as long as possible."

In an increasingly difficult market Harris Pye Engineering is thriving, and it is because they are differentiating themselves from the competition by exhibiting and delivering true value to their clients.

**Vornel: That is impressive. Any closing thoughts gentlemen?**

**Allen:** It is good that Venkat mentions the importance of value. Things may be tight for many in our industry, but the bottom line is that we all have to get better at delivering even better value to our clients – and that includes us at Intergraph. Oscar Wilde said that a cynic was "a man who knows the price of everything and the value of nothing."

We owe it to ourselves to fully know the value of the decisions we make and actions we take. Only when we ruthlessly pursue value can we know that our decisions are made for the best possible reasons, and that is because we know the best possible outcome.

**I would also add that a major reason for the success of our solutions, in delivering value, is the strong pre- and post-sales support provided through our Intergraph offices and dedicated channel partners worldwide. In Middle East and India the strong physical presence and dedicated team ImageGrafix has in place, helps ensure that customers have the right solutions and, through training and support, are using them effectively. This has increased the confidence level of the clients to embrace CADWorx as a reliable plant design solution for small and medium size projects in the region. ●**

*ImageGrafix is the Intergraph CADWorx & Analysis Solutions Global Network Partner covering Egypt, the Middle East and India.*



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