Technology and Weathering the Economic Storm

Focus on the Oil & Gas Industry
Mustang Engineering
ORLEN Projekt
Vietsovpetro

Intergraph® No. 1 Process Engineering Tools Provider
ARC Advisory Group

Managing Project Execution with Global Worksharing
Fluor Corp.
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s we enter the second quarter of 2009, it’s astounding how much the world has changed in the past six months. Process industries, and in particular, the chemical, oil and gas sectors, are facing the most severe challenges they have seen in 80 years.

With so much change, it’s good to know that there are some things you can still count on. Intergraph is one of those, celebrating its 40th anniversary this year. As an industry leader and a trusted partner, Intergraph remains financially solid, having concluded one of its most successful years ever, and we look to the future with a strong order book. With a diversified product portfolio, operating in 63 countries, supporting a mixed base of clients between CAPEX and OPEX phases of the life cycle, and $200 million cash reserves in the bank today, Intergraph continues to be the best bet for clients who want dependable, high-value solutions and services.

Intergraph understands the importance of investing in down times and continues to invest robustly in research and development to ensure our enterprise engineering solutions meet the evolving needs of you, our valued customer. We are honored that the ARC Advisory Group has independently validated Intergraph’s industry-leading solutions and ranked our company as the No. 1 overall worldwide provider in the engineering design 3D software and Process Engineering Tools (PET) market in its recently released PET Worldwide Outlook Market Analysis and Forecast through 2013.

At a time when CAPEX and resources are more constrained than ever, doing more with less is the key. Intergraph is responding with proven solutions for higher productivity. Clients are claiming 30-40 percent user productivity improvements with our new 3D technology. With more than 11,000 hours of actual use from satisfied clients, we know that the supporting 3D virtual training program is accelerating and expanding education at lower costs than ever before. And, for advanced users, the automation API with Smart 3D technology provides the opportunity for further labor savings and higher quality deliverables with the opportunity for clients to maintain proprietary ownership of strategic automation capability.

Because SmartPlant® and SmartMarine® Enterprise solutions can be implemented quickly and in a modular manner, the incremental investment made now not only will pay off quickly, but also position your company in front of the competition when recovery does come. As always, we are proud to be your partner, especially as we weather this economic storm together.

Patrick Holcomb
Insight Editor
Executive Vice President,
Global Business Development
Intergraph Process, Power & Marine
Focus on the:
Oil & Gas Industry

- FROM THE TOP:
  How to Master the Economic Storm

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- EPC PERSPECTIVE:
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- CASE STUDIES:
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Intergraph SmartPlant® and SmartMarine® Enterprise Provide Productivity and Competitive Edge for Oil and Gas Industry

Intergraph, the world’s number one process engineering tool provider overall and for the oil and gas, and refining industries,* counts the world’s largest petrochemical companies among its many process industry customers.

Today, as never before, oil and gas companies of all sizes are facing tremendous challenges to remain competitive and profitable amid diminishing demand and harder to extract resources.

This oil and gas special section follows three examples of how Intergraph’s SmartPlant Enterprise software solutions have helped EPCs, owner operators and large companies maintain a competitive edge and to streamline their work processes, increase data consistency, conform to industry standards and construct global collaborative environments to enable concurrent designs on an engineering database.

Please read on to see how these companies rely on Intergraph to help them solve their business challenges, increase their productivity and remain at the forefront of this volatile and ever-changing industry.

Insight recently discussed the economic downturn and its effect on the industry with Gerhard Sallinger, president of Intergraph Process, Power & Marine.

**Insight: What trends are you seeing in the oil and gas industry?**

**Gerhard Sallinger:** The price of oil and gas is the key factor. The price “needed” for new capital projects depends on the region and type of oil or gas field. How and where the oil or gas is located are heavily related to the cost to get it out of the ground. Simply speaking, a low oil price, say below $50 per barrel, means that many new projects are put on hold. A price above $50 means that new projects will be launched or re-launched.

Most of the new oil or gas being explored today comes at a higher cost. The times of cheap oil are over. Most of the new oil and gas fields are in places that don’t offer an adequate infrastructure and are located where it’s difficult to extract the oil and gas out of the ground. Some examples of these fields include the polar region, deep sea areas, and the Canadian oil sands fields.

Overall, we are seeing a growing number of projects put on hold due to today’s low oil and gas prices. By the way, the same is happening in the mining industries.

**Insight: What are your thoughts on the chemical and power industries?**

**GS:** Most engineering companies I meet with still have work and a good backlog of projects, but for many, their order logs are getting shorter. Currently there are not enough new projects in the market to feed everyone.

The same is true for the shipbuilding industry in which new orders are generally rare. Although the established shipbuilders, namely in Korea and Japan, still have large order books, the backlog is melting down.

Newer shipbuilding companies, established in the last couple of years to take advantage of the previous boom in the industry, are hit even more heavily. I would not be surprised to see some yards get into deep trouble or even cease to exist.

**Insight: What trends are occurring in the engineering and shipbuilding markets?**

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Based on customers’ feedback, we strongly believe that our solutions can significantly help. Customers who use our SmartPlant Enterprise solutions report significant savings from increased productivity and reduced cost and time.

I am glad to see that our heavy investments in software development are paying off in the best possible manner – offering better solutions to our customers and allowing us to be the most successful software vendor in our industry – a win-win for everyone!

Jana Miller is editorial director of Insight and is based in Huntsville, Alabama, U.S.

www.intergraph.com

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**How to Master the Economic Storm**

Intergraph solutions can increase productivity to provide a critical competitive edge

By Jana Miller

Intergraph Corp. generated revenue of US$808 million and operating income of more than $150 million in 2008 and ended the year with a cash balance of more than $200 million. Intergraph PP&M has consistently produced strong and profitable growth over the past several years with total revenue of approximately $340 million in 2008. PP&M 2008 revenue represented a compound annual growth rate of more than 20 percent since 2003.

**Insight: Is now a good time to take a look at advanced technology?**

**GS:** Yes, I strongly believe so. Industry leaders see the dark clouds on the horizon and they are concerned. Now is the time to prepare for the rough waves ahead.

Our technology can help the industry to face these challenging times. My honest advice to everyone is to use the remaining time wisely before the storm arrives, evaluate the available options and determine what can be done. Prepare yourself for the storm and act quickly to explore how better technology can make your company more productive.

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SmartPlant® 3D —
Increase productivity with application and data interoperability

Make the most of your enterprise engineering design data investment. Support integrated plant modeling and design from concept to operations and maintenance.

Intergraph® SmartPlant® 3D is an open, data-centric, multi-discipline plant design solution proven to increase productivity with streamlined modeling workflows.

EPCs and O/Os from around the world rely on Intergraph’s integrated plant design environment for real business benefits:

**Engineering rules-based design**
Complete projects more quickly, more accurately, at less cost. Benefit from seamless integration between modeling, analysis, reporting, and fully automated drawing production tasks with engineering rules-based design.

**Global worksharing**
Enhance multi-site, concurrent engineering and data sharing of the evolving 3D plant design with industry-standard worksharing.

**Automate the plant design process**
Capture engineering knowledge and expertise as part of SmartPlant 3D’s integrated automations.

www.intergraph.com

Boost interoperability
ARC Advisory Group Ranks Intergraph No. 1 Worldwide 3D Design and Process Engineering Tools Provider

Research reveals value customers derive from SmartPlant Enterprise

By David Joffrion

Intergraph has been ranked the No. 1 overall worldwide leader in the engineering design 3D software and Process Engineering Tools (PET) market according to the 2009 PET Worldwide Outlook Market Analysis and Forecast through 2013 by the ARC Advisory Group.

The report provides an in-depth analysis of the worldwide PET market for engineering software used in workflow practices and data management for designing, building, operating and maintaining process plants. The tools and applications covered in the PET study include a large portion of those necessary to manage engineering activities that create or use engineering data throughout the life cycle of a plant.

As the overall PET leader, Intergraph was ranked first in key global regions and process industries as well as functionalities such as 3D engineering design.

“Intergraph offers a large and comprehensive portfolio of products that provides users with a compelling value proposition,” said Tom Fiske, Ph.D., senior analyst with ARC Advisory Group and the author of the PET study. “In addition, Intergraph’s integrated life cycle solutions preserve and leverage knowledge reuse through all stages of the asset.”

Gerhard Sallinger, Intergraph Process, Power & Marine president, said, “The results of ARC’s PET global market study validate why our customers have rapidly adopted SmartPlant Enterprise across 3D design and the other engineering disciplines. They experience a quick return on their investments, increased productivity and streamlined operations resulting in shortened project timelines, all of which gives them a competitive edge that is so important particularly in challenging economic times.”

Intergraph’s SmartPlant Enterprise offers a powerful portfolio of next-generation, best-in-class plant automation solutions that leverage critical project information and knowledge to improve and automate work processes, from the very early project phases through plant operations and maintenance up to decommissioning. For most projects, SmartPlant Enterprise improves plant engineering efficiency by up to 30 percent.

Over the past two decades, ARC Advisory Group has become the leader in providing in-depth and accurate market intelligence for the industrial automation marketplace. ARC consultants follow technology and industry events on a daily basis and use a five-step approach to conduct market research, providing a solid framework to formulate meaningful strategies for their clients. This approach is proven and is designed specifically to conduct global market research for the industrial automation marketplace.

David Joffrion is a contributing editor for Insight and is based in Huntsville, Alabama, U.S.

www.arcweb.com
To share his perspective on the economic downturn and how his company is addressing these challenges, Insight recently asked Don Leinweber, vice president of corporate services at Mustang Engineering, based in Houston, Texas, U.S., to discuss current trends and his thoughts on the future.

**Insight: What trends do you think we will see in the oil, gas and offshore industry in the near-term?**

**Don Leinweber:** Upstream remains strong, both onshore worldwide and offshore. Larger projects may delay in schedule to take advantage of distressed commodity prices. Tighter credit markets will have a greater impact on oil & gas companies more dependent on outside financing. Downstream projects will likely continue to be impacted until refinery margins return and foreign demand for motor fuels and chemicals increases. The chemicals markets have declined and we expect this to last throughout 2009. Consolidations or acquisitions are also expected. The super-majors can buy reserves (smaller independents) for much less than their own exploration costs, but they can’t operate them profitably, so we expect them to focus on acquiring the mid-size oil companies with stronger cash positions. This activity has not traditionally increased the workload of engineering companies near-term.

**Insight: What trends do you expect to see in the next five years?**

**DL:** We believe businesses will recover substantially due to India and China slowing down less than the U.S., creating a faster comeback for petroleum products. We expect to see the resumption of more lump-sum engineering work, compelling the use of technology to regain a competitive advantage. Much more worksharing will occur as the world continues to flatten. The majors have lost access to many oil markets worldwide due to the national oil companies (NOCs) going it alone. So, we expect our level services to the NOCs to increase.

**Insight: What are the most pressing challenges facing the industry?**

**DL:** Our primary challenge is meeting growth expectations in a shrinking market. We are constantly changing and reshaping to remain competitive. We need to work seamlessly across offices and with lower cost centers to gain a competitive edge. Finding the funds to enhance technology in a slower economic cycle is another challenge.

**Insight: How can technology help the industry solve these challenges?**

**DL:** As the industry transitions from a seller’s market back to a buyer’s market, pricing pressures will be a challenge for many. This will demand tight project management systems and a lean project execution methodology.

Owners will seek to contain their costs due to tight money markets using lump-sum engineering and construction. This shift should make integrated life cycle solutions more attractive, as the full benefits can again be realized. Worksharing across offices will increase in importance as companies seek lower-cost engineering solutions to remain competitive. Networking speed should not be compromised in the process and online training will become a necessity.

Corporate travel will continue to tighten. This will make online training and Web meetings much more important.

Jana Miller is editorial director of Insight and is based in Huntsville, Alabama, U.S.

www.mustangeng.com
ORLEN Projekt SA is one of the largest and most experienced design companies in Poland. The nearly 40-year-old company specializes in plant design for the refinery, petrochemical and chemical industries and has successfully used Intergraph engineering software for a decade.

The company constantly seeks ways to stay competitive and improve productivity to meet customers’ evolving needs. Among the new business and engineering challenges that prompted us to look for new solutions are:

- Growing complexity of large-scale EPC projects
- Tighter deadlines to complete projects
- Difficulty in recruiting new engineering personnel
- Continuing client demands for high quality.

Based on our past success using Intergraph solutions such as PDS®, we decided to extend our relationship with the company. Intergraph offers a comprehensive solutions suite, SmartPlant Enterprise, covering the entire EPC process.

“Our experience with Intergraph gave us the confidence to implement the system while working on a live project,” said Wlodzimierz Garwacki, technical director at ORLEN Projekt.

According to recent Process Engineering Tools research by ARC Advisory Group, Intergraph ranks first for the chemical and refining industries and also leads in engineering design for the chemical and refining industries.

ORLEN Projekt Steps up Productivity
Upgrading from PDS® to SmartPlant 3D and new solutions yields productivity gains for Poland-based engineering firm

By Wieslaw Gontarek

Saving time and money
SmartPlant Enterprise delivers significant time and cost savings for large EPC projects with reduced timeframes. In addition, new engineering staff members and existing engineers and operators can easily learn how to use the SmartPlant Enterprise solutions suite.

For our pilot EPC project, the Claus sulfur recovery unit, we used a variety of Intergraph SmartPlant Enterprise solutions:

- SmartPlant Instrumentation — Automation
- SmartPlant P&ID — Technology and process
- SmartPlant 3D — Construction, mechanical (pipelines, equipment)
- SmartPlant Electrical
- SmartPlant Reference Data
SmartPlant Foundation – enterprise engineering data management.

Going live

Intergraph implemented the SmartPlant Enterprise solution with support from ORLEN Projekt’s IT department. After less than three months of training, our engineers learned how to use SmartPlant 3D, the next-generation, data-centric successor to PDS, and SmartPlant Electrical. We then implemented the solutions on an active project.

“Each group entered the design process immediately after training, giving operators the opportunity to put what they had learned into practice,” said Lukasz Cieplucha, application engineer in the IT department at ORLEN Projekt. “We expect to be ready for complete production within six months. In addition, we are using Intergraph’s support services to design and match the project environment.”

To meet ORLEN Projekt requirements, SmartPlant Enterprise tool customization included creating:
- 14 material classes together with "special" elements for piping
- Report templates
- Technical isometric drawings
- Orthographic boards.

Immediately after configuring the environment, a new EPC project was started for the Claus sulfur recovery unit. The project is 40 percent complete. The company is using the following applications:
- SmartPlant P&ID – 15 executed schemes
- SmartPlant Instrumentation – 900 instruments, 256 loops
- SmartPlant 3D – 65,000 objects, including approximately 150 pipelines.

Accessible data

In the project’s current stage, SmartPlant Enterprise environment data are processed by ORLEN Projekt branch offices. The owner can access data as part of the project review. In the future, we plan to use the data during the procurement process and for construction. We can also offer high-quality data for owner operators. We plan to integrate SmartPlant Enterprise with our third-party systems as well.

There are five SmartPlant P&ID users, four SmartPlant Instrumentation users, 10 SmartPlant 3D users and three administrators.

Information system implementation can challenge any company, but it can also deliver real benefits during project execution. From our experience, we would recommend a similar configuration, which we believe is the key to company success.

Faster design

The SmartPlant Enterprise implementation helped us complete the project and meet the schedule requirements of our client.

“After just a few months working with the project, we realized the system helps us speed the design process by approximately 30 percent using new 2D and 3D design tools,” said Garwacki. “We can also improve productivity by 20 percent utilizing the tools to integrate design tasks and control the documentation of design data exchange.”

Implementing a single integrated environment across all disciplines increases project quality. It also makes it easier to manage necessary changes during the later phases of a facility’s life cycle.

Wieslaw Gontarek is the CEO of ORLEN Projekt SA and is based in in Plock, Poland.

www.orlenprojekt.pl

About ORLEN Projekt SA

ORLEN Projekt SA specializes in technical projects for technologically advanced producers and infrastructure and in technical consulting for refinery, petrochemical and chemical industries. The company offers support at any stage of an investment, from concept and design through delivery chain, execution and startup.

ORLEN Projekt traces its roots back nearly 40 years. Mazowieckie Zaklady Rafineryjno- Petrochemiczne (now PKN Orlen) founded Zakladowe Biuro Projektów ZBP (Factory Project Office) in 1972. The company was renamed ORLEN Projekt in 2001. PKN Orlen holds a 51 percent stake in ORLEN Projekt, with the remaining 49 percent owned by employees or individual shareholders.

Over the years, ORLEN Projekt has executed a large number of projects for many customers in Poland and around the world. In 2007, the company executed 157 design projects (three of which were EPC projects) for 30 customers.

ORLEN Projekt employs 180 people, with 75 percent focused on design activities. The company strives to provide excellence in design and meet various global standards and governmental requirements, including ISO 9001:2000 standards. ORLEN Projekt can handle the most complicated projects, and partners with its customers for success.

Wlodzimierz Garwacki
Technical Director, ORLEN Projekt

Quarter 2, 2009
Vietsovpetro (VSP) is a Vietnamese-Russian joint venture focused on the production of oil and gas from offshore sources; exploration and survey work for the oil and gas industry; well drilling; and the design, assembly and repair of offshore facilities. Responsible for approximately 80 percent of the nation’s oil and gas output, VSP helps Vietnam rank third in oil production and export in Southeast Asia.

VSP has produced more than US$33 billion of oil and gas and continues to grow fields through new discoveries and the enlargement of existing fields. The company contributes about 25 percent of Vietnam’s national revenue, making it the largest contributor to the state’s economy.

**Advanced technology**

When it comes to maintaining and managing our assets, we face a number of challenges. It is important that we invest in and embrace good technology to address these needs.

With Intergraph technology, we are able to quickly visualize, question and analyze situations so that we don’t make costly mistakes.

We have been a longtime user of Intergraph applications, beginning with PDS. We chose Intergraph because it offers a complete solutions portfolio to satisfy project execution needs.

When we first learned about the advanced concepts that SmartPlant 3D offered such as relationships, associations and rule-based engineering, we knew without a doubt that SmartPlant 3D is the future of engineering. We began to migrate our PDS seats to SmartPlant 3D seats soon afterward.

**Data integrity**

At VSP, we perform a large number of designs and modifications for new and existing offshore platforms. It is a challenge to keep track of the changes and the related documentation updates when we use a traditional CAD-based approach.

With Intergraph SmartPlant Enterprise solutions, design and documentation activities are synchronized. This means we can ensure the data integrity of the design or model.

Keeping track of existing, new and future data is also important when we work on proposals. When a change occurs, we want to make sure that there are no clashes or operability or maintainability issues.

Because of the number of changes we make on our facilities, we chose the SmartPlant Enterprise platform. Specifically, SmartPlant 3D was our top priority.

With SmartPlant 3D, we can easily manage data in both the 3D model and in outputs such as drawings. Once our model for a platform is built, it serves as an as-built model of the facility. This enables us to query, report and extract any type of deliverable depending on the request. We also intend to use the model as an initial data set when we engage contractors for major modification projects.

VSP’s Science Research and Design Institute (NIPI) division is focused on design and engineering. NIPI uses SmartPlant 3D for the design and update of our offshore platforms. Since there are very few changes to the structural members on these facilities, the majority of the work is related to mechanical and piping.
NIPI uses SmartPlant 3D for tasks such as design and installation of new pipelines and equipment items, extraction of general arrangement drawings, piping isometric drawings, equipment layouts, pipe support drawings and various types of reports.

As-built model
SmartPlant 3D manages the as-built 3D model of our RP2 offshore platform. We use SmartPlant 3D to model the existing process system and main structure of the platform. With Intergraph’s advanced solution, we designed and modeled the new process system, including equipment, piping, auxiliary structure and pipe support.

SmartPlant 3D helped us perform design check and review. We were able to generate deliveries to meet VSP's standard formats for 2D drawings as well as equipment and piping plans, piping isometric drawings and MTOs.

Services
Having experienced and knowledgeable local partners gives us confidence in upgrading our Intergraph technology. We chose Intergraph because of the high level of support we receive from Intergraph and its local partner in Vietnam, Credent Technology.

The Intergraph consultants are experienced and very knowledgeable. Most of them have experience in working for large EPC companies. They bring to the table not only software experience but also project execution knowledge, which is very important to us.

Our PDS users took a SmartPlant 3D training course. Intergraph and Credent training staff were available in the office to offer assistance afterward for approximately four weeks. This was perfect for the users to get used to the new system.

We have received excellent service from Credent for both training and customization. We customized catalogs, specifications, symbols, drawing templates and more.

We wanted to start from scratch with SmartPlant 3D, so no data migrations were performed. All of the catalog and specification items were created by referring to the softcopy documentation and manufacturer catalogs.

Constant support from Intergraph and Credent was very helpful in guiding us along our initial path. We started our first SmartPlant 3D project within just two months. We definitely see productivity benefits in using SmartPlant 3D.

About Vietsovpetro
During its 28 years of experience, Vietsovpetro has accomplished a number of noteworthy achievements. The company has built a synchronized and advanced technical system onshore and offshore to supply oil and gas production.

VSP was the first to discover and efficiently exploit Vietnam’s unique basement oil reservoirs, such as White Tiger, Dragon, Big Bear and Eagle. The company has developed technical solutions for optimal exploitation of subsoil resources. These techniques have attracted the attention of foreign investors to petroleum exploration and production on Vietnam’s southern continental shelf, and the attention of worldwide scientists as well.

The joint venture has become the main force of Vietnam’s petroleum industry and economy. VSP has produced nearly 161 million tons of crude oil from its White Tiger, Dragon and Big Bear oilfields, with total crude oil turnover at approximately US$33 billion.

VSP has boosted Vietnam’s economy across a broad spectrum of industries. The supply of gas from the White Tiger field has brought the development of energy, fertilizer-chemicals and fuel gas industries in addition to improving shipping repair, port and warehouse services, petroleum products distribution and even tourism.

The company plays an important role in the development of local economy and culture. VSP has contributed millions of dollars from both its corporate fund as well as employee voluntary contributions for building infrastructure, historical-cultural care, schools, hospitals, and supporting victims of poverty and both domestic and foreign natural disasters.

The president of Vietnam has twice given VSP the nation’s highest award, the Hero of Labor Golden Star of Vietnam, along with many other honors. Such great achievements are the results of tireless efforts of the company’s 6,500 employees.

VSP has attracted the attention of foreign investors to petroleum exploration and production on Vietnam’s southern continental shelf, and the attention of worldwide scientists as well.

In the future, we plan to expand our use of SmartPlant 3D in conjunction with our other SmartPlant Enterprise solutions to ensure that other relevant information such as P&ID and instrumentation data is maintained in an as-built status.

We recognize that having access to new technology is vital. One of our most important tasks is to help our employees enhance their professional knowledge, apply technology and gain project execution knowledge. This is the biggest value we add to our organization – by building up our greatest asset, our employees.
Managing Project Execution with Global Worksharing

Fluor maximizes productivity of multiple offices with SmartPlant Instrumentation and Citrix

By Tom Woodbury, P.E.

It is difficult for engineering offices to staff projects at a single location with the number and size of projects currently booked. To meet this need, engineering companies are worksharing with their offices around the world.

Before SmartPlant Instrumentation, spreadsheets, databases and drawings were produced in different offices. Eventually, all these data had to be re-integrated for turnover to the owner.

Now, using a common platform such as SmartPlant Instrumentation over the Internet, Fluor offices in Calgary, New Delhi, Manila, Haarlem, Gliwice, Houston and Greenville are connected together. Projects are executed around the clock. And as more companies use SmartPlant Instrumentation, then owners, management and construction teams can have windows into the data to review, provide input and generate their own custom reports.

"... successful worksharing is based on sound communications – both human and software ...

Tom Woodbury
Control Systems Principal Engineer, Fluor Corp.

Implementation

Worksharing with Citrix and SmartPlant Instrumentation has helped us work more productively with our colleagues around the world to better take advantage of skill sets and speed completion time.

One method Fluor delivers applications to PCs uses Citrix, a portal solution. The Citrix environment at Fluor consists of more than 60 Citrix servers located in 17 sites around the globe.

All Citrix applications are virtualized using Microsoft Application Virtualization (MAV), formerly known as SoftGrid. MAV’s packaging process is used for faster application deployment with cleaner installs.

Citrix Presentation Server downloads virtualized application packages from the nearest MAV server and parcels them out via the Citrix ICA Client software installed on PCs or via the Web.
Before we started worksharing, everyone would link into the same Oracle data server, and when a new user came online he would download the Intergraph SmartPlant Instrumentation application to his PC and then start using it.

**Before worksharing**

To perform upgrades, you had to redo the whole system. For example, if we upgraded Oracle, then we had to reload Oracle and SmartPlant Instrumentation. On a typical project there would be anywhere from 20 to 25 applications to reload. It would take a couple of days to get everyone’s machines upgraded. This meant we lost valuable time with our team.

**After worksharing**

As a solution to this problem, we decided to try worksharing. For our first attempt with worksharing, we separated the data server. We added Citrix and put SmartPlant Instrumentation on Citrix.

We continued to use the SmartPlant Instrumentation application downloads from the headquarters to keep users up to date. Remote users didn’t have to worry about downloads. They just kept logging in and working.

Things were going well until we started having printing issues with Citrix. Users didn’t know where the INI file was. Citrix had to have everyone’s various servers, printers and drivers specified. But when you’re in Haarlem using OCE printers and we’re in Greenville using IBM printers, the printer configuration was always different.

To solve the printing problem, we chose a MAV server. It took the application away from the Citrix server so Citrix doesn’t even see it. When someone logs in and wants to use SmartPlant Instrumentation, MAV goes to the Citrix server and actually makes a virtual machine (or server) that is specific for that project.

This MAV configuration solved a lot of problems for us. It improved printing. You could print anywhere you wanted to—locally, remotely or anywhere you had access over your normal network connections.

Now that we had load sharing, instead of everybody hitting the same Citrix server, MAV would go to the Citrix server with the least load, and then finally get back to where the data server was.
That’s where the redundancy came in. If you lose a Citrix server, or whole server farm, the MAV configuration would continue to operate transparently to the user.

Another benefit is that we can support people working on multiple versions of SmartPlant Instrumentation. It didn’t matter whether they used version 6, 7, 7.1 or 7.5. They can go from project to project and not have to change computers.

We’re still downloading applications for the headquarters people. So we thought why not continue and let even the headquarters people use Citrix. It depends on the office, but the latency period between the time a person makes a keystroke and actually gets the work is not any different than if you were running it standalone on your home computer.

I’ve had good experiences with Citrix. Citrix offers good security. The headquarters office has two layers of security. Users log in as normal and then log in using the normal SmartPlant Instrumentation login name and password. At Fluor, we’ve decided to keep the two separate. We don’t use Microsoft’s domain capabilities to share the passwords.

When you’re outside Fluor’s domain, we’ve allowed client access with read-only capabilities. Clients can open up browsers and review the data. By giving them a secure ID, our clients are able to log in remotely and review all the data to look at instrument index, data sheets and loop sheets whenever they want.

The benefits of using a Citrix and MAV environment include:

- Real-time 24-hour access to current data from dispersed locations
- Apparent faster speeds at satellite locations
- More efficient workstation deployment, i.e. software no longer needs to be installed on individual workstations; users can work on multiple projects without software versioning issues
- Faster project deployment because it is only necessary to deploy a single database for the host
- No data transfer between host and satellite databases

- No downtime if Citrix servers are down at one location since the application can be re-routed to a different location
- Load balancing since there is no loading of applications on Citrix servers
- User accounts can be reset without impacting other users
- Local printers are virtualized so Citrix does not need print drivers
- Since the Citrix server does not have SmartPlant Instrumentation, its own applications cannot be corrupted, nor can SmartPlant Instrumentation be corrupted if other applications are added to the Citrix server.

**Network speeds**

- Citrix
  - Typically much less than 200 milliseconds (ms)
  - Normal max 350 ms
  - Tested successfully to 650 ms
- Network
  - Some site connectivity as low as 2 Mbps
  - Fluor total Multi-Protocol Label Switching (MPLS) bandwidth: 784 Mbps
  - Mixture of satellite, fiber-optic, T1, sub-T1 and Cat 5/6 (to desktop).

The Citrix network speed is typically much less than 200 ms, which is pretty quick. Normally, most people experience a maximum of 350 ms for retrieval of data, and we’ve tested it without any application dropping out at 650 ms.

Our network offers a wide bandwidth, as Fluor uses a mixture of WAN applications. Sometimes we have some remote sites where the speed is very slow compared to a T1 line, and we have some performance issues, but again, Citrix has helped solve that.

A couple of years ago I worked on a project where Greenville was the lead office. We workshared with Vacaville (near San Francisco) and Manila. Manila’s job was to produce all the wiring section of SmartPlant Instrumentation. We had a Honeywell system with 30 I/O cabinets. There were approximately 10,000 I/O total on the project. We used DeviceNET and we stretched V6 by having more than 120 devices on a segment to manage. We had to print the drawings on really large pieces of paper.

The connection to Vacaville was the slowest part. We were never able to upgrade the connection between our San Francisco office and the Vacaville construction site. Even then, to do an instrument index, it took them three-to-eight seconds, depending on the time of day. At times they used enhanced SmartLoop segments with more than 30 nodes, and it took 10 to 20 minutes to generate a segment. By then, we had generated most of them anyway and stored them on the server. Vacaville users were able to access those segments but weren’t able to do a live update with any consistency.

I am now working on a project where Calgary is the lead office, so that’s where the Citrix servers are located. Greenville and New Delhi are the workshare sites, and the job site is in Jubail. There are a lot of connections. The slow connection gets down to the construction site. There’s a lot
of filtering that goes through the Saudi network, which also causes some latency.

On this project, most of the times are about half of what they were before. So just in the past four years, we were able to halve the time needed. Even in India, they take up to eight minutes to generate. Loop sheets with both the classic I/O and fieldbus take up to five minutes. But this is the exception and generally for large loops and fieldbus segments.

For a Middle East chemical project, Calgary was the home office, which meant it took the lead. Calgary had a design team responsible for 60 percent of the plant, and Greenville was responsible for the remaining 40 percent of the complex. New Delhi produced most of the data sheets, loop sheets, installation details and bulk-type work.

We distribute the work among various office locations based on a number of reasons. It may be based on geography, type of complex or main disciplines. In this case, the process stayed in Greenville and Calgary, so it didn’t make sense to split up the process data work to New Delhi. There was specific work in Calgary that they were working with Calgary vendors, so it didn’t make sense to split that work out with the people in New Delhi.

Calgary was listed as the headquarters so it set the tone for the overall project. It had to determine all the standards that are common to all the complexes set by Calgary, such as:

- Are we using uppercase or lowercase for the service descriptions?
- What’s the service description format?
- How is I/O put in?
- What do the loop sheets look like?
- What do the segment diagrams look like?
- How will instrument datasheets be set up?

As the execution centers, we were responsible for filling in the data using the forms that Calgary set. Then we were responsible for contacting the home office when we encountered form and function problems.

**Communication**

To summarize our experience, one of the key issues we recognized should come as no surprise — communication. There are a variety of ways to communicate. First, we held a kickoff meeting with users from our offices around the world. Our New Delhi team visited the offices in Greenville and Calgary. We all met and went through the list of deliverables for the project. Basically we identified field by field, “You will fill this in, the process engineer will check it, we’ll do this part because we have the piping people in Greenville,” etc.

Just having that face-to-face time also builds teamwork and camaraderie and helps you work towards a common goal. Being together in the same room reduces that office vs. office mentality that sometimes comes out in the form of “We can do things faster,” or “They don’t know what they’re doing.” When you get to meet someone, you find out they are actually a nice guy.

**User manual**

The SmartPlant Instrumentation user manual basically includes the tables that are in the product. The instrument index features a set of tables. We printed out those tables to create our user manual. That’s how we communicate the allowed fields in each of the tables.

We do have a level of revision control so that people can’t just go in and add stuff on their own. For example, various users might type for the instrument manufacturer’s model:

- MicroMotion
- Micromotion
- Micro Motion.

There are many ways that the field naming can be confused. So we had to standardize on even basic things like that.

We provide training. When new people joined the project, we gave them a new manual, and asked them to read it, which they rarely did, of course. So a day or two later, we would sit down and go through each of the sections and highlight the key points that specifically related to their job. If they weren’t working on wiring, we didn’t go through that section.

**Job bulletins**

The job bulletin concept was developed in Greenville and then spread to the other offices. A job bulletin defines a work process that’s not specifically defined in the project execution manual. For example, if someone wants to know how to issue a document like an instrument index, the user looks in the job bulletin for those steps.

**E-mail**

We frequently use e-mail with our projects. We copy others on the CC: line of the e-mails to keep all of the other leads apprised of SmartPlant Instrumentation situations. We use same-time messaging at Fluor with AOL Instant Messenger on a very fast network.

For example, I arrive at work at 7:00 a.m. That gives me two hours of same-time conversation with the team at the other end of the network in New Delhi.

**Phone**

Sometimes you just have to pick up the phone. We seem to put that last, but in certain situations, it should be the first step of effective communication. We had weekly telecoms between Greenville, New Delhi and Calgary.

**Samples**

We encourage others implementing this solution to produce samples. It’s very important to do this.

We encountered a lot of problems with wire labels. You would think that wire labels would be simple. But each person’s interpretation of the “from” and “to” or its format is very specific in how you enter it into SmartPlant Instrumentation.

So I actually had to create some wire labels and print them out on the panel strip adjacent drawings or the loop sheets. We tested the samples to see if they fit, and then we worked through any issues.

In conclusion, successful worksharing is based on sound communications — both human and software — tweaked to the individual needs of users, corporate culture and workflows.

Tom Woodbury is a control systems principal engineer at Fluor Corp. and is based in Greenville, South Carolina, U.S.

**www.fluor.com**

**Editor’s Note:** MAV and the specific configuration mentioned in this article are not supported by Intergraph. Please contact your account manager for more details.
Managing the handover of data and documentation from CAPEX projects to operations is a formidable and labor-intensive task. The volumes of data handed over are enormous, with a typical $1 billion CAPEX plant having 200,000 tags, 100,000 documents and up to 20 million characteristics and relationships. Data are submitted from multiple sources (contractors, suppliers, authorities, etc.) and are often delivered incomplete and with errors.

The challenge of validating and correcting errors can be compounded if data are delivered very late in the project life cycle, with staff demobilized, budgets exhausted and management focused on how to finish the project as quickly as possible. The handover from a $1 billion CAPEX plant can typically cost $10-15 million and take up to one year to successfully validate and load operations systems.

Performing a high-quality data handover is critical to ensure the safe, reliable and effective operation of a process plant. If the quality of information handed over to operations is questionable, there is a constant need to physically verify the true physical state of the plant. This can drive up the cost of plant modifications by 30 percent.

A best-practice approach to ensure a smooth handover of data from project to operations includes the following prerequisites:

- A well-defined information handover specification incorporated into all contracts
- An organization responsible for follow-up of handover requirements
- A process of continual incremental handover of data
- A mechanism to receive and verify data received and loaded into target systems

Intergraph has extensive experience in assisting our customers with data handover by providing information specifications, assistance in quality control and loading of data. Our new tool, Validation, Transformation and Loading (VTL), a SmartPlant Enterprise for Owner Operators solution, combines our many years of experience in data quality control and loading with requirements identified by key customers.

Handover from CAPEX projects

VTL is a comprehensive solution that manages data acquisition from multiple sources. Data are held in a staging area, subject to rigorous quality control before being extracted for loading into target systems, including Intergraph’s SmartPlant Enterprise suite and third-party applications.

The solution enables owner operators and project management contractors to verify the quality of incoming data prior to loading into target project or operations systems. It empowers EPCs to check the quality of information deliverables before sending them to customers. The extensive tracking process of all data submissions, checks performed and results will offer complete audit-able traceability of the handover process.

Data validation during maintenance and operations and legacy data migration

VTL can play a key role in efforts to improve and maintain data quality during the operations phase of a plant. Data may be extracted from operations and maintenance systems into VTL to validate data quality and perform corrections as part of a data quality improvement exercise before reloading back into operations systems.

Data from turnaround projects and OPEX modifications can be very extensive. Systems can be validated in VTL to ensure correctness and completion prior to approval for loading into operations systems.
VTL can also play a key role in data migration from legacy systems. Data can be loaded from existing applications for verification before loading into new target systems.

**Data import**

Incoming data submissions from one or more sources are imported into the VTL staging area. The customer provides mapping and transformation tools. Any mapping tool capable of generating XSLT, such as MapForce from Altova, can map incoming data or export data to be loaded into target systems.

The import module reads incoming files and transforms these using the XSLT generated from a mapping tool. The incoming file format may be provided in accordance with the supplier’s standard, the owner’s handover specification or an international standard such as ISO 15926. The import module’s advanced features prompt users for input or can calculate values based on incoming data if needed. Users can check incoming .CSV files for compliance with ISO-8859-P15 and RFC 4180 standards to validate characters used and file structure.

**Staging area**

Based on Intergraph’s industry-leading information management repository, SmartPlant Foundation, the staging area provides a highly robust and flexible repository to meet the needs of target systems. The staging area is used to create and maintain rules and rule sets, and hold the details of all tests and test results.

The staging area validates loaded data. VTL supports a wide range of rule types and you can define your own rules, executing rule sets on data submitted to the staging area.

The types of rules you can define include:

- Syntax rules
- Uniqueness validation
- Relationship cardinality
- Date/time validation
- Integer/float validation
- String and pick list validation
- PL/SQL and DLL rule definitions – for more complex rules
- Unit of measure validation
- Mandatory fields validation
- Cascading errors – errors on one object can create errors on associated objects.

You can apply the PL/SQL rule type to more complex rules, such as comparing two characteristics for an object. For example, users can check data sheets to ensure that maximum operating temperature for an equipment item does not exceed maximum design temperature. You can also apply this rule type to compare data in the staging area with data already loaded into a target system.

The cascading rule type propagates an error on one object to all related items. For example, a customer can create a rule specifying that if one tag within an instrument loop is in error, then all other items in the loop must also be set in error.

**Data export to target systems**

The SmartPlant VTL export module enables the filtration and export of data that again can be transformed by XSLT from a mapping tool and initiate loading programs to load data into Intergraph SmartPlant Enterprise tools or third-party applications.

**Added value**

VTL significantly reduces the time and costs associated with validation of data handover from brownfield/greenfield projects and turnarounds to operations. It also improves the range, quality, consistency and traceability of validation performed.

A very extensive range of user-definable rule types can be easily created with forms prompting the VTL administrator for input. You can restrict rules to a single plant or extend them to multiple plants. Once rules and rule sets are created, they can be rapidly executed against incoming data submissions. Established rules and rule sets ensure efficiency and consistency in testing. The staging area captures all results from testing, providing full auditable traceability of what testing has been performed, by whom and when, as well as the results of the testing.

VTL is based on well proven, SmartPlant Foundation technology that provides a highly configurable, robust staging area. Data submitted from multiple sources can be managed within the staging area. SmartPlant Foundation users can easily adapt to VTL. Comprehensive user access control in SmartPlant Foundation can allow control of who can:

- Create rules and rule sets
- Execute validation
- See results of validation.

In addition, VTL provides a highly flexible export mechanism that can initiate external loading programs to target SmartPlant Foundation systems, SmartPlant design tools or third-party applications.

**Insight**

Adrian Park serves as global technical director of owner operator solutions for Intergraph Process, Power & Marine and is based in Stavanger, Norway.

**More information**

More information about SPO, including a brochure and solution sheets, is available at www.intergraph.com/ppm/spo.aspx. Register to download SPO white papers at www.intergraph.com/spo.
Murray & Roberts Celebrates Century of Progress
South African EPC grows from building houses to designing nuclear power plants

By Brian C. Bruce

Murray & Roberts is South Africa’s leading EPC company. For more than 100 years, Murray & Roberts has played a leading role in the socio-economic development of South Africa and the southern Africa region and has participated in some of the world’s leading engineering projects both at home and abroad.

From humble beginnings in 1902 as an emerging house builder in the Cape Colony, Murray & Roberts steadily expanded throughout southern Africa, across all industry sectors and into many international markets, pioneering the introduction of new technologies, materials and methodologies into its domestic construction and engineering industry.

For its first 75 years, the company developed under the leadership of its founding families. Douglas Murray inherited Murray & Stewart from his father John in 1928 and co-founded The Roberts Construction Co. in 1934 with his friend and colleague Douglas Roberts. They were later joined by Dr. Andrew Roberts. The three entrepreneurs played a major role in the formal development of the South African construction and engineering industry.

Andrew Roberts is remembered for his foresight in adopting new and innovative engineering and construction ideas. Among many other achievements, he developed the concrete mine headgear which made efficient deep-level mining possible, introduced new procedures for lining and equipping mine shafts, and led the introduction of prestressed concrete to South Africa.

Early development of the company was linked to mining and industrial development in the hinterland of South Africa, coupled with the need for transport infrastructures to convey commodities and goods to and from the ports along the South African coast.

Where Douglas Murray followed a strategy that maintained geographic focus in the Cape, he sought growth through diversification into construction materials and services as well as the industrial sector. Douglas and Andrew Roberts, however, retained focus on the construction sector and sought growth through geographic diversification into Africa and elsewhere.

The Roberts Construction Co. converted to a public company in 1948 and was listed on the JSE Limited in 1951. Murray & Roberts was formed in 1967 following a merger with Murray & Stewart, but the two companies continued to
operate as separate businesses until all operations were fully consolidated in 1979.

In 1984, The Murray Trusts entered a shareholder agreement with Sanlam, a South African financial services group. The group controlled more than half of the issued shares of Murray & Roberts. By 1989, Sanlam had taken control of the company, influencing board appointments and strategy. Numerous industrial businesses from the Sanlam stable were sold into Murray & Roberts.

By 1995 Sanlam had reduced its share below 35 percent, and a new executive leadership was in place. Shares sold at an all-time high and the PE ratio was 20 times earnings. But then the bubble burst. EPC activities shrank to less than 30 percent of group business. Beginning in 1996, Murray & Roberts delivered a continuous flow of poor performance. Almost 50 percent of shareholders funds had been destroyed and 90 percent of market capitalization was lost by 2000.

Rebuilding

Rebuilding Murray & Roberts is an intervention strategy introduced in 2000 through the appointment of new executive leadership to the Group. It was aimed at the fundamental transformation of Murray & Roberts over an initial five-year period, building a sustainable business model for earnings growth and value creation into the future.

The disposal of non-core assets has unburdened Murray & Roberts from its troubled past and set free the resources to acquire new strategic capacity. The current business model has approximately 75 percent of activity within South Africa, of which two-thirds represent contracting activities. The current project order book is evenly distributed between global mining construction, southern Africa engineering and construction and the Middle East.

The market capitalization of Murray & Roberts has increased by 650 percent over the period since 2000, representing a compound annual growth rate of approximately 45 percent.

Physics lessons

An early breakthrough in identifying cultural deficiencies in Murray & Roberts came from an unlikely source – quantum physics and chaos theory. Using the Lorenz Attractor as our model, we researched the repetitive failure dynamics of Murray & Roberts over a number of years and found that even when overall performance seemed sound, there were serious systems failures hidden within the organization.

A commitment to increased transparency has exposed these failures to public scrutiny, when they could easily have been hidden from view. But the lessons learned help the organization to form the basis of our opportunity management system to filter the introduction of project risk.

Local and global

One of our first actions was to eliminate the silo structures and hierarchical management culture. Being a united Murray & Roberts became the only acceptable culture.

We also looked at how we defined ourselves. Murray & Roberts is integrated within the fabric of South African society. This is the basis of the company’s strategic clarification statement “We are South African.”

The company also operates in the international marketplace, so the group describes itself globally as “We are Murray & Roberts.” A global benchmarking study delivered a comprehensive framework that described “best-in-class” features among the world’s leading engineering and construction businesses.

A further research project into the characteristics sector consolidation showed that most public and private sector clients are driven by national issues, but some markets (in particular natural resources) are driven more by global dynamics. The “two sides of the same coin” concept allowed Murray & Roberts to develop its “local and global” growth strategy focused on the construction economy.

Murray & Roberts has performed international projects since the 1960s and currently generates about 40 percent of its revenues from international markets. The company has secured a lead position in a number of significant major projects.

Focus

Murray & Roberts is primarily focused on resources-driven construction markets in industry and mining, oil and gas and power and energy. It offers civil, mechanical, electrical, mining and process engineering; general building and construction; materials supply and services to the construction industry; and management of concession operations. The company’s core competence in industrial design delivers major projects and services primarily to the development of emerging economies and nations.

Noteworthy projects

Seabed mining is an exciting new technology. To design solutions for this, Murray & Roberts is leveraging its capability in underground and open cast mine design and planning, system dewatering and materials handling with its vessel design and experience in the offshore oil and gas industry.

Our company’s focus on innovation extends to supporting our clients in the development of their breakthrough technologies. Murray & Roberts, in partnership with SNC-Lavalin, is associated with the Generation IV Pebble Bed Modular Reactor (PBMR) project. Our role is engineering, procurement and construction management services for PBMR.

Brian C. Bruce is the group chief executive of Murray & Roberts and is based in Johannesburg, South Africa.

www.murrob.com
Intergraph’s Power Focus Group is an international organization with four main goals:

- Provide a structured forum for power industry thought leaders to focus on specific life cycle engineering and information management technology requirements that are unique to the industry
- Form a bridge for a united “power community” that speaks through a strong single voice of representation
- Guide Intergraph in product direction and specific functionality that will benefit the entire power industry
- Represent fairly and respect the diversity in geography, culture, regional governing regulations and workflow requirements of companies engaged in power industry-related work.

The Power Focus Group is growing stronger every day with 110 members from 17 clients in six countries.

By Charlotte Hughes

The Power Focus Group is made up of several topic areas that deal with specific needs, including:

**Integrated Piping & Hanger System Design**

Piping system designers in all industries can benefit from a design environment where piping layout, pipe stress analysis, pipe hanger design and hanger analysis are highly integrated. This topic area will define elements (such as pipe stress condition, structural analysis of engineered supports, hanger and support location and selection, drawing generation, etc.) that are required in Intergraph’s integrated solution for Piping & Hanger System Design.

**Concrete, Penetrations & Embedments**

The design of the concrete structure in nuclear plants, along with the definition and management of penetrations and embedded
parts, are significant tasks. SmartPlant 3D’s modeling and relationship management capabilities offer a great opportunity to optimize this design activity. This topic area will define the necessary modeling functionality, including penetration and embed management.

Integrated Air Flow Diagram & SmartPlant 3D Ducting
Nuclear power plants require substantial ventilation in the generation of steam. This topic area will define the requirements for data, symbology and integration with design and simulation tools used during the creation of air flow diagrams.

Industrial Architecture
All power generating plants require basic architectural elements such as floors, doors, walls, windows, etc. The concept of rooms and spaces is especially critical for nuclear plant design. While a full-fledged architectural package is not necessary, some important capabilities found in architectural applications are mandatory. This topic area will identify and define the necessary functions, reference data and resulting deliverable templates for basic industrial architecture.

Reference Plant
The ability to design standard power plants for subsequent reuse is important to the power industry and is often referred to as “The Reference Plant.” SmartPlant Enterprise will be critical to the success of this concept during the design, construction and maintenance of power plants. This topic area will identify and define the configuration of SmartPlant design applications, SmartPlant Foundation schemas, and integration maps necessary for Reference Plant creation and reuse.

Validation & Verification (V&V)
Nuclear industry regulations require engineering data to be verified and validated as a part of the design process. Traditional paper-based V&V processes of the past are not ideal. Today’s SmartPlant environment offers integration and automated change management capabilities for more efficient V&V. This topic area will identify and define the necessary SmartPlant configuration and work processes to provide an optimal V&V solution that meets regulatory requirements.

Instrumentation/Electrical Schematics & Deliverables
While SmartPlant Enterprise is designed to service many industry segments, each industry has its own specific work processes, such as for instrumentation and electrical design. This topic area will provide input to help Intergraph identify and understand desired work processes and deliverables such as schematics, specifications, wiring, etc.; package units; and special safety regulations unique to the power industry.

Simulation Integration
The conceptual phase of a project is key because the majority of decisions, such as CAPEX, operability, safety, etc., are made during this time. Simulation of the process design is a key element in this task to optimize the design parameters in-line with the scope of the project. This topic area will define the work processes for the conceptual design phase and the integration requirements with SmartPlant Enterprise.

Kraftwerk-Kennzeichen-System (KKS) Products
KKS is a well-adopted standard for the power industry, covering tagging, structure and nomenclature of plant components. Intergraph customers are seeing more projects where KKS standards are required. Intergraph has KKS-enabled the SmartPlant reference data through an agreement with VGB, the standards developer. This topic area will review the utilization of the KKS standard on projects in practical work processes and required deliverables at key project milestones.

Charlotte Hughes serves as executive program manager for Intergraph’s Global Industries Group and is based in Huntsville, Alabama, U.S.

For more information or to join Intergraph’s Power Focus Group, please visit www.intergraph.com/power/focus.aspx.
Radio frequency identification (RFID) technology is not new. But recently, this technology has become cheaper and easier to apply to various applications, such as asset management.

Several RFID pilot projects have been successfully performed integrating third party products with Intergraph’s SmartPlant Materials. These RFID solutions are very flexible and open the door to exciting new opportunities.

**Capabilities of RFID solution**
- Track materials throughout their lifetime when building a facility
- Identify materials on-site
- Verify materials after installation
- Integrate asset identification with materials cost data
- Learn about a component’s history
- Ensure that components are stored properly.

**Benefits of RFID solution**
- Manage material in the warehouse more effectively
- Save time by instantly identifying the location of components
- Simplify maintenance with complete component history available on PDA
- Easily fit the solution into existing workflows
- Enhance personnel security management.

**Your RFID solution**
Intergraph will work with customers to address their specific business needs. Please contact us to learn how we can help you create your own RFID solution.

Michael Buss is vice president of materials management and project controls at Intergraph and is based in Huntsville, Alabama, U.S.

[www.intergraph.com/ppm/mmpc.aspx](http://www.intergraph.com/ppm/mmpc.aspx)
CB&I Expands Use of Intergraph SmartPlant Materials

CB&I (NYSE: CBI), a leading global EPC, has expanded its use of Intergraph SmartPlant Materials material management software. As part of CB&I’s implementation of SmartPlant Materials as its materials management system across its global network of 80 offices and 18,000 employees, CB&I will migrate legacy data and business processes to SmartPlant Materials.

CB&I will focus its use of SmartPlant Materials on its energy and natural resources projects, including oil and gas and offshore installations, across the complete project execution life cycle. From materials specification and BOM change management, through procurement and inventory tracking, to forecast, and material issuing, Intergraph anticipates improved efficiencies for CB&I across all material management work processes.

Designed to drive efficiency in plant engineering and construction, SmartPlant Materials can help avoid costly material surpluses and shortages, and reduce overall project risk. The resulting savings on multi-million dollar projects can be significant.

Iv-Oil & Gas Expands Use of SmartPlant Enterprise Solutions Set

Iv-Oil & Gas B.V., a Dutch multidisciplinary engineering, procurement and construction (EPC) company, has expanded its use of Intergraph SmartPlant Enterprise solutions to further increase productivity and cost savings throughout the design, engineering, purchasing and construction cycle for its onshore and offshore oil and gas projects.

A SmartPlant Enterprise user since 2002, Iv-Oil & Gas has already experienced productivity gains and the ability to accelerate projects using Intergraph’s next-generation 3D modeling and visualization, instrumentation, and electrical design software solutions. Now, by easily integrating its existing solutions with SmartPlant Materials and SmartPlant Reference Data, the EPC will be positioned to manage project materials and reduce costs for its customers’ capital-intensive oil and gas projects from preliminary design through detail engineering and purchasing to construction.

“SmartPlant Enterprise has already shown significant increases in productivity. We expect SmartPlant Materials to enable Iv-Oil & Gas to provide procurement and material specifications information in a faster, more accurate and efficient way, providing us with another boost to our efficiency,” said Wim Bal, general manager of Iv-Oil & Gas. “We, as well as our project partners, vendors, suppliers and construction companies, will benefit throughout the procurement and materials management processes.”

SmartPlant Materials handles bills of material and requisitions, procurement and supply chain functions, fabrication tracking and site tasks including receiving, warehousing and construction material planning. It allows customers to share materials data with design and line-of-business systems, clients, contractors and suppliers. It also can reduce engineering hours up to 15 percent, restrict surplus materials to less than one percent and reduce total installation cost up to three percent.

SmartPlant Reference Data is a pre-configured solution that eliminates the need for customers to re-enter the same standard reference data. Intergraph has built a standard database for SmartPlant Reference Data that delivers a comprehensive range of commodity codes that can be used to uniquely describe materials throughout a project life cycle. The standard database employs sophisticated and exhaustive rules to maintain material descriptions, and is delivered configured to support 90 piping component definitions according to U.S. standards (ASME/ANSI, ASTM and API). The content of these 90 piping components includes more than 10,000 commodity codes and more than one million individual parts with full dimensional data, including weights.

Iv-Oil & Gas offers a full range of engineering services tailored to the needs of its oil and gas clients including process, mechanical, structural, electrical, instrumentation, piping design, piping engineering and procurement expertise. 

www.iv-oil-gas.nl
SmartPlant Isometrics with INOVx® Creates Piping Isometric Drawings from As-Built Plant Models

Intergraph and INOVx® have integrated the industry-standard Intergraph SmartPlant Isometrics with the INOVx RealityLINx® Asset Virtualization™ software to allow process industry operations and maintenance personnel to seamlessly create piping isometric drawings directly from “as-built” virtual plant models.

The integration allows plant-based operations, maintenance and engineering staff to create up-to-date and accurate piping isometric drawings with SmartPlant Isometrics for inspection, fabrication and construction, based on the “as-built” high definition laser-scanned model in RealityLINx Asset Virtualization.

SmartPlant Isometrics together with RealityLINx provides plant personnel with a simple, cost-effective way to update and then maintain old plant layout drawings and asset documentation. SmartPlant Isometrics is a cornerstone of SmartPlant Enterprise for Owner Operators (SPO), enabling information associated with a pipe to be maintained and presented in different forms during the lifetime of the plant. Through the RealityLINx virtual asset model, plant operations and maintenance personnel can work within a laser-scanned 3D virtual plant model and gain seamless, role-based access to asset-related information across the enterprise.

“Most plants need an ‘as-built’ data model due to cumulative modifications of the original plant design. This ‘as-built’ asset model is created using INOVx’ approach for creating a virtual plant model. Now, with their cooperation with Intergraph, the as-built data model can be used to generate the isometric drawings with greater accuracy,” said Ralph Rio, research director, ARC Advisory Group.

Intergraph Will Now Offer DNV Early Ship Design Software

Intergraph will now resell DNV Software’s Nauticus Early Design software as part of its integrated SmartMarine Enterprise solution to speed ship and offshore platform design and increase accuracy by seamlessly transitioning from the conceptual design and rules calculation phase to detailed and production design without the need to remodel.

Nauticus Early Design, which is based on Intergraph’s SmartMarine 3D development platform with additional stringent DNV classification rule calculations modules for the marine industry, is a complete package for ship early design integrating 3D CAD and ship analysis systems.

It combines new-generation 3D modeling and drawing generation which are integrated with the well-established analysis capabilities of Nauticus Hull for class rules check and finite element analysis, Sesam and GeniE. The system’s advanced rule engine allows knowledge-based marine engineering, a high degree of automation and elimination of repetitive modeling tasks which contributes to shortened lead time and increased quality of the design.

Early Design rule calculations are needed to receive class approval signifying that the offshore platform or ship construction proposed is of sound engineering and therefore applicable for insurance purposes. The rules are based on more than 100 years of experience gathered by the class societies.

“Asset Virtualization is transforming best practices to take advantage of accurate virtual plant models,” said Costantino Lanza, CEO of INOVx Solutions. “Through our cooperation with Intergraph, we are able to provide a convenient bridge to legacy work processes that depend heavily on isometric drawings. This is very important to our mutual customers.”

Gerhard Sallinger, Intergraph Process, Power & Marine president, said, “Our work with INOVx provides exciting new capabilities for plant staff to leverage ‘as-built’ laser scans in the context of an integrated enterprise during the operational phase of the asset life cycle.

“This development not only demonstrates our openness but also our continued efforts to integrate innovative solutions into the engineering enterprise to help owner operators operate their plants more safely and efficiently.

Leveraging Intergraph’s advanced development platform, Nauticus Early Design and SmartMarine 3D require no manual interface, allowing users to transition directly from conceptual design to detailed and production design, without the need to remodel, ensuring design consistency and single entry of information.

Manual interfaces and remodeling require additional design time and contribute to errors. However with the Nauticus Early Design and SmartMarine 3D, customers can work completely in a single model and therefore ensure consistency in design, accuracy and the single entry of information.

“Our rules calculation and analysis modules combined with Intergraph’s design platform provide an exceptional architecture to enable ship and marine designers to have a powerful new way to ensure safe designs with the speed necessary to meet today’s demanding production deadlines,” said Elling Rishoff, managing director, DNV Software.

Gerhard Sallinger, Intergraph Process, Power & Marine president, said, “Our expanded alliance with DNV, one of the world’s leading class societies, continues our commitment to our growing ship and offshore customer base and to delivering increased productivity to provide our customers a competitive edge.”

www.dnv.com/services/software
Intergraph Releases SmartPlant Enterprise for Owner Operators Project Execution Solution

Intergraph has released the third solution of its SmartPlant Enterprise for Owner Operators (SPO) portfolio, SPO Project Execution. Complementing the previously released SPO Core and SPO Operating Plant solutions, SPO Project Execution provides processes for the successful execution of greenfield/brownfield capital expenditure (CAPEX) projects by owner operators and project management contractors.

The SPO solutions portfolio enables plant owner operators and project management contractors to create and maintain the engineering design basis, optimize plant operations, increase productivity throughout the plant life cycle and shorten project schedules. SPO Project Execution builds upon the SPO Core solution, which manages core work processes and is a prerequisite for implementation, and includes out-of-the-box business packages for managing project changes, non-conformities and technical queries.

Savings resulting from SPO Project Execution can amount to between two and five percent of CAPEX costs — highly significant on today’s billion-plus dollar projects. These savings result from improved management and visibility of project change as well as schedule reduction and earlier production by avoiding project delays brought about by late responses to technical queries. Additionally, the handover of non-conformity data related to affected plant assets can result in annual operational expenditure savings of $2-3 million per $1 billion CAPEX investment. This comes from reducing the probability of plant incidents and, where incidents do occur, enabling documentation to be rapidly presented to allow the plant to be brought more quickly back into production.

Patrick Holcomb, executive vice president for the Intergraph Process, Power & Marine division, said, “The release of SPO Project Execution is another milestone in our efforts to provide owner operators the tools they need to manage their assets, reduce costs on CAPEX projects, and address operations and maintenance needs while increasing interoperability throughout the plant life cycle.”

The SPO Project Execution Solution provides a unique level of change control within plant engineering and design projects, reducing the risk of cost and schedule overruns. It ensures auditable traceability through the review, approval and implementation cycle for changes using automated workflows and adherence with owner operator project authorization matrices.

Non-conformities to relevant laws, regulations, corporate governing documents, and project specifications all need to be closely managed on projects. The SPO non-conformity process is closely linked and integrated with other SPO project execution processes, such as technical queries or management of change, and complies with regulatory requirements for managing non-conformities. The SPO non-conformity process provides auditable traceability of the process of reviewing and approving non-conformities and facilitates linking them to affected parts of the plant, such as area or system tag.

www.intergraph.com/ppm/spo.aspx

Intergraph Releases SmartPlant Isometrics, New Piping Design Solution for Small Projects

Intergraph has released its newest SmartPlant Enterprise solution for quickly and efficiently producing industry-standard pipeline isometric drawings for small piping projects. The most recent version of Intergraph’s industry-leading piping isometric sketching software increases engineering productivity with expanded capabilities, including a SmartPlant-style user interface, concurrent engineering of multi-pipelines, instant 3D visualization, display of dimensions, and enhanced selection and editing tools.

SmartPlant Isometrics is a next-generation tool offering many new features and improvements, making it more productive and superior to its predecessor. The new SmartPlant Isometrics solution for small projects is complementary to SmartPlant 3D, which is suited for larger, more complex piping design projects. Both piping design solutions are powered by ISOGEN®, the de facto standard solution used to generate piping isometrics completely and automatically.

Formerly known as I-Sketch™, SmartPlant Isometrics now enables users to:

- Design several unconnected pipelines within one session and produce pipeline isometric drawings for each
- Create an instant 3D scaled view of pipelines, enabling new pipelines designed in a confined location to be visually clash-checked with existing pipelines
- Design complete connected piping systems and produce piping system isometrics

SmartPlant Isometrics is an ideal tool for a small plant-based engineering office. It can be used to implement small piping design projects, to bring existing designs up to as-built status and to maintain accurate plant documentation.

Based on ISOGEN technology, the industry standard for automatic generation of piping isometrics, SmartPlant Isometrics helps users to sketch piping systems in only minutes and generate isometric drawings with full bills of materials (BOMs) in seconds.

Andreas Böing, project manager at Hertel-Enning, one of the leading German companies in the piping systems and plant construction sector, said, “We look forward to the additional features that SmartPlant Isometrics will provide us. After comprehensive tests Hertel-Enning is convinced that our company group can certainly benefit from the ability to handle multiple pipelines and piping systems from the P&ID through design, fabrication and construction into plant operations.”

www.intergraph.com/ppm/products.aspx
Global Events Bring Great Success
Large attendance shows growing interest in SmartPlant and SmartMarine Enterprise solutions

By Jana Miller

Intergraph Process, Power & Marine (PP&M) attracted increased user interest at enterprise engineering software users’ meetings with record-breaking attendance at 24 meetings in 21 countries on six continents. More than 3,400 Intergraph PP&M users from the power, oil and gas, offshore, shipbuilding, mining and materials handling industries attended meetings in Australia, Brazil, China, Finland, France, Germany, Ireland, Japan, Korea, The Netherlands, Norway, South Africa, Venezuela, Vietnam and the U.S.

The division also exhibited at industry conferences around the globe and began the year hosting at daratechPLANT 2009, showcasing its market leadership.

Latin America
In October, Intergraph Venezuela held its third annual users’ conference. More than 30 EPC and O/O representatives from companies such as Inelectra and PDVSA came to Maracaibo for a full day of presentations.

Intergraph Venezuela hosted interactive presentations on 3D Modeling and Visualization; Engineering and Schematics; Information Management; and Procurement, Fabrication and Construction. These presentations emphasized Intergraph solutions’ benefits throughout the facility life cycle. To facilitate understanding of the different software, Intergraph’s staff used videos, software demonstrations, and examples of successful projects from around the world.

This event emphasized the benefits of data-centric tools and integration. Events such as these promote close relationships with clients. Through these partnerships, Intergraph understands customers’ real-world projects, challenges and suggestions.

Organizers received an overwhelming positive response from conference attendees, such as this comment: “The Intergraph Maracaibo 2008 agenda was excellent. Intergraph’s products are very important for engineering project development.”

The Intergraph Maracaibo Users’ Conference allowed clients to learn how they can use Intergraph tools to create, manage and use critical engineering data to increase productivity and face industry challenges.

Europe, Middle East, Africa and India
Intergraph held a Europe, Middle East, Africa and India Industry Tour. It visited user group conferences and TUF meetings in the following countries:

- Finland
- France
- Germany
- Italy
- The Netherlands
- Norway
- Poland
- Spain
- United Kingdom.
Spain and South Africa marked milestones with their meetings. The PP&M Spain User Meeting marked its 10th anniversary with approximately 100 attendees from 40 companies. More than 100 of South Africa’s most prominent plant, power and mining engineering professionals and users attended the fifth annual PP&M Industry Tour to learn how SmartPlant Enterprise can increase engineering productivity and reduce costs for developing massive projects. A wide range of South African O/Os and EPCs were represented at the Intergraph solutions update. Scandinavia hosted specialized meetings. An O/O Seminar was held in Sweden and a SmartPlant Spoolgen and SmartPlant Isometrics seminar was conducted in Norway.

Intergraph also exhibited at regional events such as Conference Power Plant Maintenance 2008 in Düsseldorf, Germany. Intergraph presented its SmartMarine Enterprise solution at SMM 2008 in Hamburg, Germany. With approximately 45,000 global attendees and 1,600 exhibitors, SMM Hamburg is the leading international trade fair for the marine industry. The VGB Congress Power Plants 2008 in Stuttgart, Germany addressed the challenges of implementing appropriate power generation strategies for Europe which meet the highly specialized requirements regarding economic, reliable power supply and environmental protection. Intergraph took part in the exhibition by presenting its SmartPlant power template and piping solution.

Intergraph Process, Power & Marine executives were welcomed presenters at the Saudi Arabia International Oil and Gas Exhibition & Conference (SAOGE) in Damman. Adrian Park, Intergraph global technical director, and Talal Jazayerli, executive director, business development, presented “Lowering Capital Expenditure (CAPEX)/Operating Expenditure (OPEX) Costs and Risks for Plant Operators through Interoperability between Systems.” This leading oil and gas industry event attracts high level technical experts, key industry professionals, specialists and decision-makers in upstream, downstream and petrochemical sectors of the petroleum industry.

Asia Pacific

Intergraph 2008 PP&M Asia Pacific User Conferences were a phenomenal success, hosting more than 1,200 delegates from countries throughout the Asia Pacific region. The five conferences, held in Japan, Vietnam, Australia, China and Korea, provided new and existing customers with the latest news from Intergraph and showcased market-leading solutions to industry representatives.

The conferences provided a superior learning and networking opportunity to customers who were unable to attend the Intergraph 2008 International Users’ Conference. The technical sessions and presentations covered the following topics:

- Engineering
- Procurement, Fabrication & Construction
- Operations & Maintenance
- Information Management
- Power
- Marine.

Conference content was tailored to suit growth sectors unique to each market – such as marine in Japan and China, bulk materials handling in Australia, and SmartPlant 3D’s design capability in Vietnam and Korea. With rapidly developing markets in the Asia Pacific region continuing as key sources of business growth in the coming years, the conferences have positioned Intergraph at the forefront of enterprise engineering solutions technology.

Organizations of all sizes were represented at the conferences, including:

- BHP Billiton
- Chiyoda Corp.
- GS Engineering & Construction
- Hyundai Engineering & Construction
- JGC Corp.
- KBR Singapore
- Mitsubishi Heavy Industries Ltd.
- Mitsui Engineering & Shipbuilding Co. Ltd.
- PT IKPT Indonesia
- Samsung Engineering & Construction
- SK Engineering & Construction
- Toyo Engineering Corp.
- WorleyParsons.

Jana Miller is editorial director of Insight and is based in Huntsville, Alabama, U.S.

www.intergraph.com/events

Upcoming events

2009 Offshore Technology Conference
May 4-7
Houston, Texas, U.S.
www.otcnet.org/2009

ACHEMA 2009
May 11-15
Frankfurt, Germany
www.achema.de

Gastech 2009
May 25-28
Abu Dhabi, U.A.E.
www.gastech.co.uk

International Marine Design Conference
May 26-29
Trondheim, Norway
www.ivt.ntnu.no/imt/imdc2009

Nor-Shipping 2009
June 9-12
Oslo, Norway
messe.no/en/ntf/Projects/Nor-Shipping

Intergraph 2009
June 15-18
Washington, D.C., U.S.
www.intergraph2009.com

Honeywell Users Group
June 14-18
Phoenix, Arizona, U.S.
buildingsolutions.honeywell.com
As the news continues to paint a dark cloud regarding the overall economic health of the world, there is a push to reduce all costs within companies and public agencies. While our industry has generally benefited from the momentum of large projects and capital investments, we can expect a slowdown during 2009 with declines in real GDP of as much as 3.6 percent on a quarterly basis. The investments in information technology projects will, of course, be scrutinized and frequently may be put on hold or canceled.

The last recession hit tech jobs hard, but this time we are seeing compelling examples of tough times cutting the other way, where firms are looking to IT for help in coping and innovating their way out of this downturn. Further, firms are beginning to understand that blind or indiscriminate cost-cutting jeopardizes core process improvement gains.

My experience is that now is the time to aggressively move forward since some of the most important corporate innovations occur during “tough” times. This happens because:

- During busy periods (which have been happily quite prolonged during this decade), there is no opportunity for discovery, training and piloting. Work just has to get done. It is during less frenetic times that people have the ability to learn, test and move up the learning curve.
- Implementing new systems within an organization represents an investment, which will produce a return when project work volume returns. There is no better time to gain value from people by allowing them to become more knowledgeable, and in doing so, better prepared to deliver superior performance now and in the future.
- Tough times increase the demand from the market to deliver superior value to achieve a competitive advantage. This is true of both owners and EPC companies. What better time to “move out from the pack” with the investments in new systems and processes?
- Technology vendors like Intergraph recognize corporate commitments during the tough times. This is frequently when vendors can concentrate on a particular company and form a “partnership” to accelerate technology innovation.
- As headcounts get frozen, information technology usage is one of the logical strategies for improving the productivity of people. As the project workload continues to fluctuate, technology is a way to ensure that a fixed workforce can respond to changes in demand.
- In some companies, information technology projects are considered capital investments (the rules on this seem to vary widely from company to company) and thus provide a way to move costs from an operating budget to an amortized capital budget. Costs are deferred until future years when the systems are fully in use.

So, as we navigate the uncertain economic climate of 2009, we should continue to keep our focus on upgrading the technologies within and use them as a catalyst for improvement … yes, even during tough times.

Joe Morray is president of Trinity Technologies Corp., a process and power industries consulting firm that helps owner/operators and EPC firms succeed in the use of information systems. The company specializes in driving companies to align work processes, technology, and organizational change requirements for the plant environment.

www.trinitytechnologies.com
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