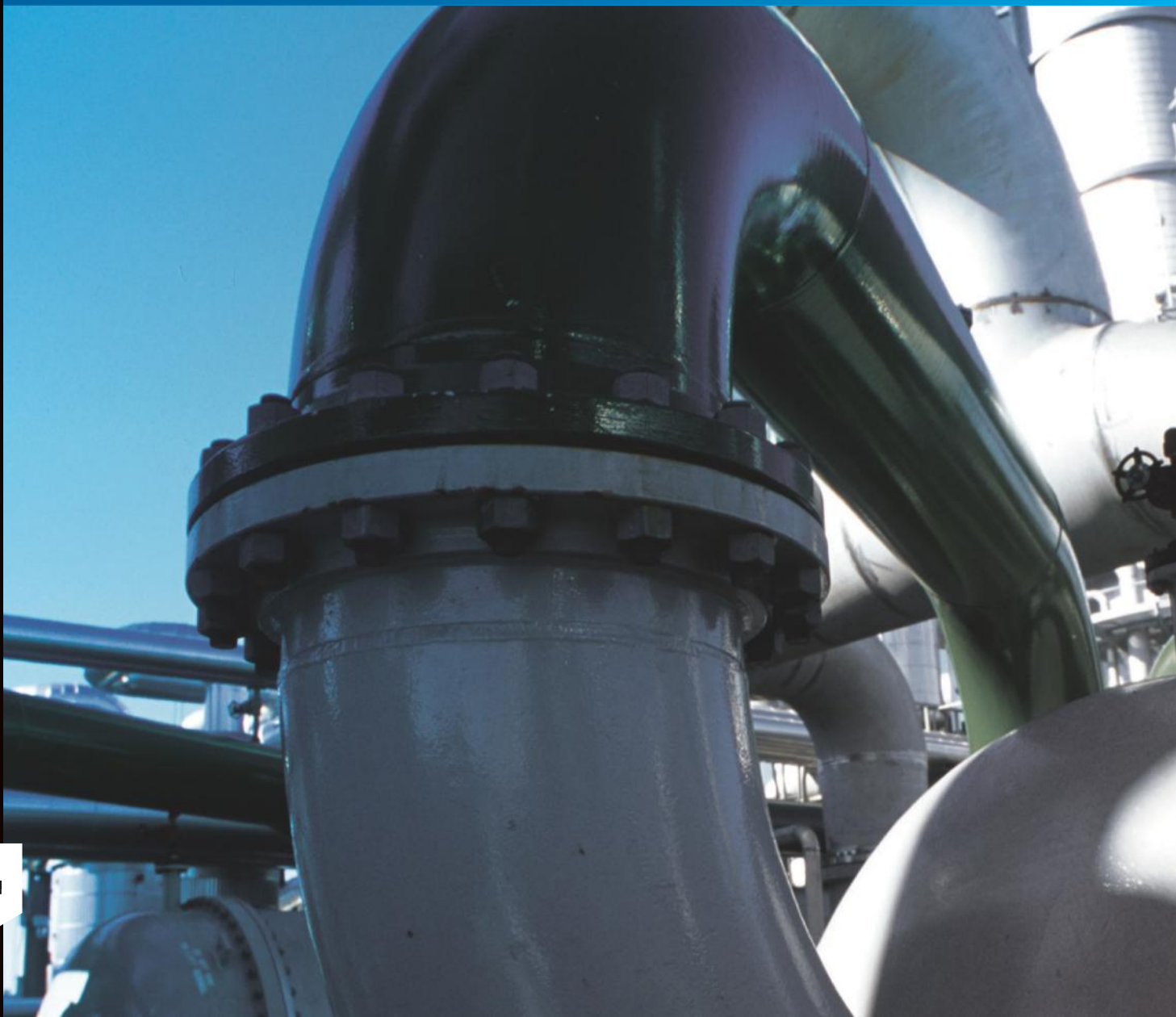# SMARTPLANT® ENTERPRISE
3D Modeling & Visualization

INTERGRAPH®

INDUSTRY CHALLENGES

Plant owner operators (O/Os) and engineering, procurement, and construction (EPC) companies alike are under continued pressure to meet global demands in a fiercely competitive commercial environment. "Faster and cheaper to market" is the double-edged call to action that drives down project margins and expects more for less in today's CAPEX process, power, and marine market.

Given this scenario, what options remain for plant O/Os and EPCs needing to retain, strengthen, or increase competitive advantage? Conventional approaches, such as top-down incremental cost reduction initiatives, have run their course. Cheaper engineering design is helpful, but is no substitute for the more sophisticated skills that the industry continues to lose, along with its experienced workforce.

A new approach is needed: one that reassesses plant engineering and operations in light of new productivity-enhancing technologies that go beyond today's plant design solutions.

INTERGRAPH® PLANT DESIGN VISION

While plant design software has grown in scope, power, and sophistication, its design and engineering fundamentals have not altered for decades. Intergraph® recognized that a step change was needed: one that would result in plant design technology anticipating and leading rather than following the industry, as O/Os and EPCs embraced a concurrent and collaborative, around-the-clock and around-the-world project engineering environment.

The resulting solution offers more than an incremental change to plant design. Faster engineering design is still important, but no longer enough. The key component in Intergraph's plant design vision is to extend the scope of plant design software to more directly manage and monitor evolving plant information and its associated project and plant relationships. This approach represents Intergraph's step change to plant design, transforming the way plant design is undertaken in the future.

THE SOLUTION: 3D MODELING & VISUALIZATION

Intergraph's 3D Modeling & Visualization solution leverages the company's domain and global expertise to offer innovative applications that meet your needs. It removes existing plant design limitations, and in their place introduces new, multi-disciplinary, silo-free ways of working – in an optimized, integrated design and visualization environment.

The resulting 3D Modeling & Visualization solution provides true workflow-managed integration between the process engineering design basis and detailed engineering disciplines, extending across and beyond the project enterprise. This consistent, multi-discipline environment is truly "intelligent" and rules-based, "understanding" the many object relationships that exist within the plant model, and maintaining the design intent as changes occur.

This environment augments and further extends Intergraph's data-centric approach by introducing additional engineering "intelligence" to all 3D plant design objects managed within the 3D plant model. This approach also extends beyond current plant design technologies to address increasing market demands.

It also allows for migration of legacy data from other plant design solutions into Intergraph's 3D Modeling & Visualization environment. The solution includes a more integrated, consistent 3D plant modeling environment. Powerful, automated tools enable rapid creation and updating of intelligent drawing and report deliverables from the 3D plant model.

Value Propositions

BUSINESS LEVEL	BENEFIT
Engineering discipline	Save hours on engineering tasks.
Project	Save weeks on schedule.
Extended enterprise	Save a percentage of total installed costs (TIC).

Improved Performance

Intergraph has conducted research among industry users to measure the impact of its 3D Modeling & Visualization solution on a plant environment. The results reveal that it:

- Delivers up to 35 percent productivity savings in key plant design disciplines compared to conventional software – and even more when it is integrated using Intergraph's SmartPlant® Enterprise solution.
- Saves time on 3D design modification compared to its conventional equivalent.
- Reduces remodeling between conceptual and detailed design by seamlessly carrying forward initial conceptual layouts into detailed design.
- Cuts the time taken to check P&ID consistency and accuracy between the 2D schematic model and 3D digital plant model.

Setting a New Quality Benchmark

Intergraph is delivering a production-ready commercial solution with the power to transform the industry. Underpinning this step change is a continued focus on design integrity and quality. Design integrity and quality can be measured in many different ways. It can be as simple as maintaining certain design rules, or as complex as reducing engineering errors. Intergraph's 3D Modeling & Visualization solution addresses both. For example:

- With real-time interference detection, you see potential spatial issues as they occur, rather than after the fact as conventional modeling systems do today.
- Automated rules preserve design intent as model objects are moved and relocated in the design, drastically reducing the amount of rework caused by edits and modifications.
- The ability to track ownership of design

INTERGRAPH – THE MARKET LEADER

Intergraph understands your needs, based on more than a quarter-century of experience with the industries we serve and the people who use our solutions:

- Two-thirds of the plants built worldwide have been designed using Intergraph plant design software.

- Intergraph solutions are used by the leading chemical, petroleum, and life sciences companies.

- Intergraph continues to reinvest about 15 percent of its revenue in the development of new technologies.

areas that break assigned, automated rules increases the model quality and ensures the design owner is still the person in control of that section of the design.

- Integrating all the major disciplines, not just piping and structural, guarantees a complete, consistent design. This ability has not been offered by traditional packages.
- Automated drawing production and model monitoring ensure that all drawings produced from the 3D plant model always reflect the current and approved model status. This means no more hand-checking of drawings is needed to make sure they match the model.

Global, Concurrent Engineering Support

Whether your project leverages high-value engineering centers, centers of expertise, or around-the-clock engineering practices, the entire design team can collaborate more effectively than ever before. With Intergraph's 3D Modeling & Visualization, you can replicate project data anywhere in the world using established, industry-standard tools. In practice, this means that as changes are made in one location, they are automatically and incrementally propagated to other locations – with all project team members working in a single, concurrent environment. The whole process can be managed from one site. Enable different engineering disciplines to work concurrently with continuous interference checking in force. This helps identify design problems more quickly. The earlier a problem is detected, the easier it is to correct – at significantly lower cost.

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Intergraph Smart™ 3D was the top solution in our benchmark due partly to its integrated work share and other appealing features, its bright future, and integration with other SmartPlant Enterprise solutions. Smart 3D will enable Fives Cail to improve design productivity and improve design quality.

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M. Alain Fruchart
Head of Information Systems
Fives Cail

Intergraph's 3D Modeling & Visualization solution helps the industry shorten its project schedules, allowing plant revenues to begin flowing earlier and project financing costs to be reduced. It also allows EPCs to better optimize their design workforces, cut construction safety risks, and slash insurance costs.

Faster and Better Design – Without Compromise

The 3D Modeling & Visualization solution provides a variety of business benefits. From a productivity standpoint, the solution increases the level of drawing automation, increasing design accuracy. Engineers can take advantage of a quick and easy-to-use environment that employs "wizards" to support and assist more complex modeling tasks, significantly shortening the learning curve required to achieve productivity. Because 50 percent of engineering time can be wasted looking for drawings and other documents, this increased automation boosts productivity and improves the efficiency of engineering design.

Importantly, the 3D Modeling & Visualization environment also offers a unified, multi-disciplinary environment in which you can learn how to use common tools spanning multiple disciplines. This is good news for design productivity, and for smaller projects in which one designer can now handle a broader range of multi-discipline activities. These optimized, consistent system commands and modeling functions also mean that engineers can learn how to use the system more quickly, shortening project schedules.

Projects designed using Intergraph's 3D Modeling & Visualization offer built-in data intelligence. Embedded engineering rules for all SmartPlant

Enterprise objects validate and ensure the consistency of your design. When one piece of design data is modified, others associated with it automatically update to reflect the design modification, maintaining design intent. These relationships promote easier updates. Again, this accelerates the engineering process and improves the overall quality of the underlying design data. The resulting 3D plant objects are now truly "intelligent," understanding their own functions and relationships relative to other 3D plant objects designed within the SmartPlant Enterprise environment. Importantly, the 3D Modeling & Visualization environment creates a unified disciplinary environment. A staff member can easily learn how to use the tools of multiple disciplines – good news for productivity, and for smaller projects and plant configuration management, in which one design engineer can now handle all the work. All discipline-specific tools, such as piping, structural, and equipment, only require a few commands.

Easier Modification Throughout the Life of the Plant

By improving the quality of asset design, the 3D Modeling & Visualization solution improves efficiency, making it easier and cheaper for O/Os to maintain and run their plants. O/Os can use the solution to preserve the value of their engineering data while also making the plant modifications that are inevitable during the life of the asset. The 3D Modeling & Visualization solution supports "as-is" and "to be" plant configurations, ensuring data integrity while saving time and money.

THE INTEGRATED SMARTPLANT ENTERPRISE FAMILY

Beyond standalone use, Intergraph's 3D Modeling & Visualization is also part of the SmartPlant Enterprise. SmartPlant Enterprise offers best-in-class applications and a low-risk, step-wise implementation approach to realizing a truly integrated engineering enterprise.

SmartPlant Enterprise includes:
- 3D Modeling & Visualization
- Analysis
- Information Management
- Engineering & Schematics
- Procurement, Fabrication & Construction
- SmartPlant Alliance Program

NEXT STEPS

3D Modeling & Visualization applications are fully supported by Intergraph Process, Power & Marine's global service network and can be tailored to meet your specific requirements. The solution can be up and running within weeks, including user training for all key disciplines. To discover how this solution could help your business, contact us today.

Products that make up the 3D Modeling & Visualization solution include:
- Intergraph Smart™ 3D
- SmartPlant Layout
- PDS®
- SupportModeler™
- FrameWorks® Plus
- SmartPlant Review
- SmartPlant Interop Publisher
- SmartPlant Markup

ABOUT INTERGRAPH

Intergraph helps the world work smarter. The company's software and solutions improve the lives of millions of people through better facilities, safer communities and more reliable operations.

Intergraph Process, Power & Marine (PP&M) is the world's leading provider of enterprise engineering software enabling smarter design and operation of plants, ships and offshore facilities. Intergraph Security, Government & Infrastructure (SG&I) is the leader in smart solutions for emergency response, utilities, transportation and other global challenges. For more information, visit www.intergraph.com.

Intergraph is part of Hexagon (Nordic exchange: HEXA B; www.hexagon.com), a leading global provider of design, measurement, and visualization technologies that enable customers to design, measure and position objects, and process and present data.

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