

A low-angle photograph of industrial pipes against a blue sky with scattered white clouds. The pipes are painted in shades of red and blue. A blue semi-transparent banner is overlaid on the top portion of the image.

Process, Power & Marine Solutions Catalog

The Intergraph logo, featuring the word "INTERGRAPH" in a bold, white, sans-serif font. A white curved line arches over the letters "I", "N", and "T".

INTERGRAPH

Intergraph supplies integrated, life cycle engineering solutions for the design, construction, and operation of process and power plants, offshore platforms, and ships. We focus on solutions that enable our customers to create, capture, and manage plant information as a strategic asset.

The mission of Intergraph Corporation is to bring its customers best-in-class engineering and information management solutions from plant concept to operations to decommissioning.

Intergraph's leadership position is backed by a proven track record of high-quality product development and delivery, a global customer base of industry leaders, and a worldwide sales and support network. We are driven to maintain our standing as the premier provider of total customer service in the industry, committed to long-term, mutually beneficial relationships with our clients and industry alliances.

Focused specifically on the needs of the marine, offshore, power, and process industry segments, Intergraph offers a breadth and depth of applications that span ship design, plant design and visualization, materials procurement and

management, plant operation, project controls, and engineering information management. Our flagship brands include the SmartPlant®, PDS®, and IntelliShip® engineering design suites; SmartPlant Materials, powered by MARIAN®; and the SmartPlant Foundation life cycle engineering information management solution.

Intergraph's unique SmartPlant Enterprise solution suite – designed for the efficient creation, capture, and management of plant information – can improve productivity in capital projects. For ongoing plant operations and maintenance, SmartPlant Enterprise for Owner Operators facilitates efficient and thorough handover from capital projects using SmartPlant Enterprise, or can be loaded with low-cost services in brownfield situations.



SmartPlant® Enterprise Technologies

Scalability

Intergraph's SmartPlant Enterprise offers a powerful portfolio of best-in-class applications, which may be deployed individually or as a flexible, integrated enterprise solution, reducing risk and improving cost-effectiveness during the implementation process. This modular architecture provides scalability, enabling clients to start small and later grow in harmony with their specific business needs to create substantial return on investment while reducing risk. This gives you the benefit of integration with the ability to take small steps in your progress toward enterprise integration.

Integration Across the Workflow

SmartPlant Enterprise leverages engineering data to improve and automate work processes, both in the CAPEX and OPEX phases. Support of such a broad array of disciplines requires an open, robust approach to integration. Product-supported integration is being expanded constantly to satisfy growing client demand.

→ SmartPlant Enterprise Components

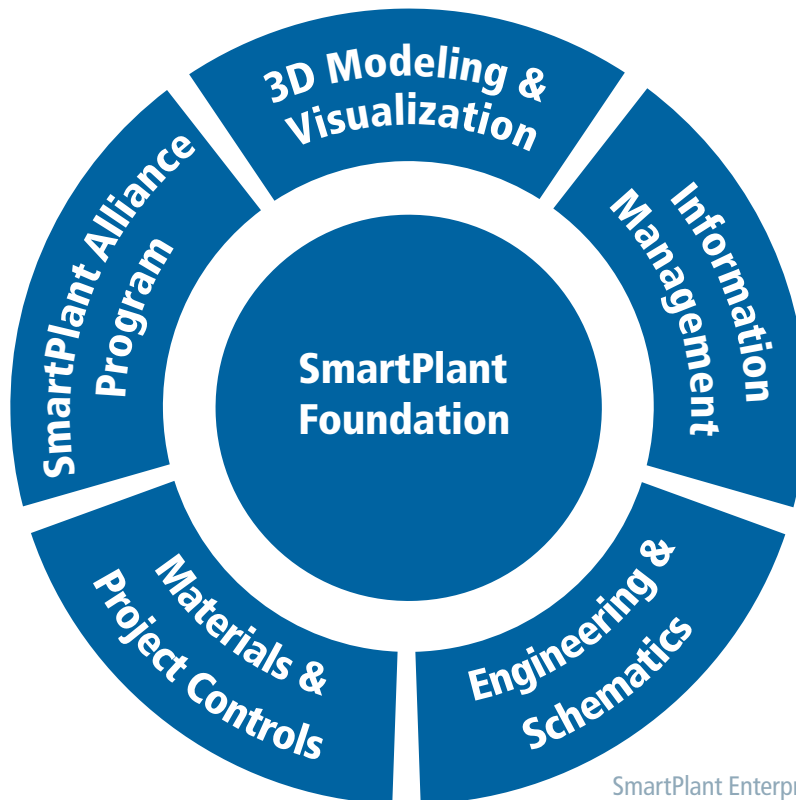
Since offering its first solution for plant design in 1978, Intergraph has focused on developing the premier plant life cycle solution – one that would enable clients to use integrated applications to execute projects or run plants more effectively and efficiently.

Today we offer a full suite of solutions for engineering firms and owner/operators that supports global workflows, allowing users to create logical and physical definitions of the plant model, and enabling access and reuse of plant data throughout the life cycle.

Intergraph's SmartPlant Enterprise addresses the following areas:

- 3D Modeling & Visualization
- Information Management
- Engineering & Schematics
- Materials Management & Project Controls
- SmartPlant Alliance Program

All of these areas are based on SmartPlant Foundation, Intergraph's information management solution, to streamline your business processes.



SmartPlant Enterprise offers an integrated, life cycle approach.



3D Modeling & Visualization

Intergraph’s 3D Modeling & Visualization applications reduce project execution schedules through automation and production efficiencies. Making changes can be time-consuming and tedious. Head-to-head studies have shown that using SmartPlant 3D technology can reduce design effort by 30 percent relative to conventional applications. This productivity is delivered through design automation and automated deliverables production. Including layout optimization, detailed modeling, and advanced visualization, Intergraph’s 3D modeling capabilities are unparalleled.

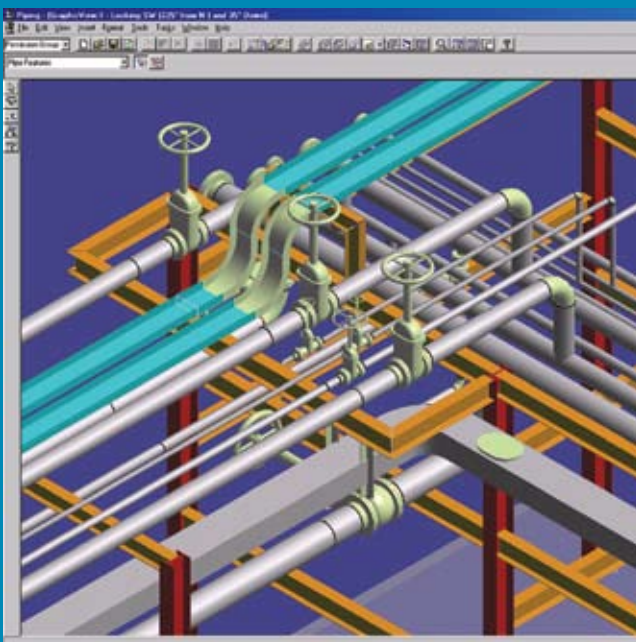
At the core, SmartPlant 3D is a multi-discipline, specification- and rule-driven modeling application that “understands” the many object relationships that exist within the plant model. Management of object relationships will reduce the cost of change dramatically. The ability for clients to develop and input their own design rules creates the additional opportunity for them to create competitive advantage over time as they build their design rule set.

→ SmartPlant 3D

SmartPlant 3D is a full-suite, data-centric solution that provides all of the capabilities needed to design a plant, and then keep it as-built throughout its life cycle.

SmartPlant 3D translates advanced functionality, usability, and work process improvement concepts into tangible business benefits to shorten schedules, boost productivity, and increase engineering quality.

These benefits are enabled by breakthroughs in database architecture, rule-based design, global worksharing, design task and drawing automation, real-time interference detection, and operating plant support. Extensibility of SmartPlant 3D includes the engineering enterprise integration and workflow management capabilities of SmartPlant Foundation, as well as front-end engineering and design (FEED) applications such as SmartPlant P&ID and third-party analysis software.



SmartPlant 3D provides 20 to 35 percent productivity gains in key plant design areas over 1970s-based CAD technology. SmartPlant 3D's tangible productivity savings include:

- More than 90 percent reduction in P&ID validation and consistency checking between 2D and 3D plant models
- 90 percent reduction in remodeling between conceptual and detailed designs
- Up to 86 percent design productivity time savings in initial 3D plant modeling
- Up to 90 percent productivity time savings when making 3D design modifications
- 20 to 35 percent overall productivity time savings through increased cross-discipline data integration

→ PDS®

PDS, the leading plant design solution, is a comprehensive, intelligent computer-aided design and engineering (CAD/CAE) application for the process, power, and marine industries. PDS creates and maintains an accurate database that provides you with valuable information for regulatory compliance, streamlining operations, maintenance, and downstream retrofit projects. PDS consists of integrated 2D and 3D modules that correspond to engineering tasks in the plant design workflow.

The software offers a variety of capabilities:

- Piping and instrumentation diagram creation
- Specification management piping
- Equipment modeling
- Structural modeling
- Electrical raceway modeling
- Interference checking
- Automated deliverables, such as isometric and orthographic drawings

→ IntelliShip®

IntelliShip is the most advanced shipbuilding design software offered in two decades. This next-generation, data-centric, rule-driven solution will streamline your shipbuilding design processes while preserving existing data and making it more usable/reusable. IntelliShip is a complementary, full-suite solution that provides all of the capabilities needed to design and build a ship.

IntelliShip provides a full range of flexible ship design, production, and life cycle management capabilities within a single integrated environment. Shipbuilders gain better decision support capabilities to facilitate global design,

production, and life cycle optimization – ultimately making the shipyard more competitive.

IntelliShip is a forward-looking product that will forever change the way ships are engineered and designed. It breaks through the constraints imposed by traditional design technology. Rather than focusing on simply achieving design, IntelliShip effectively enables optimized design, increasing productivity and shortening project schedules.

→ SupportModeler™

SupportModeler™ integrates the modeling of pipe hangers with the rest of your plant design. This 3D tool for pipe supports will provide a better quality design by automating fabrication drawing production and supplying custom libraries for built-in design rule checking. SupportModeler is fully integrated with PDS.

By incorporating the tasks of fabrication drawing production, material take-off, ISO annotation, visualization, and interference detection into a single modeling operation, SupportModeler helps reduce both time and cost.

“ IntelliShip will make tremendous changes in the traditional ship design and construction process, and I believe these changes are well on the way to our goal of significantly reducing design and construction errors. We can also reduce shipbuilding time and man-hours while better automating our production activities in the near future. ”

Yeong Soo Bae, Samsung Heavy Industries



→ I-Sketch™

I-Sketch™ is a powerful pipe-sketching application that uses ISOGEN® technology. Piping engineers and designers use I-Sketch to produce industry-standard isometric drawings quickly and cost-effectively.

Users simply sketch the pipe; add components such as flanges, valves, gaskets, and bolts as required; and dimension the pipe. I-Sketch then produces industry-standard isometric drawings with full bills of materials in just a few seconds. Isometric drawing templates include:

- Check
- Final
- Fabrication only
- Erection only

- Final weld information
- Final with cutting list information
- Overview

Checking the accuracy of existing piping data is easy with I-Sketch. Users can import IDF or PCF files from any 3D plant design system that uses ISOGEN and then use I-Sketch to update piping to as-built status.

→ SPOOLGEN®

SPOOLGEN® facilitates the transfer of electronic piping information from design to fabrication and is widely used by the world's leading piping fabricators. Fabricators can easily split isometric drawings into spools for delivery to the workshop, and the system will automatically generate all necessary drawings and reports.

Using simple functionality, piping fabricators can add fabrication and construction information to electronic IDF or PCF data files without the need for re-drafting or re-entry of material data. Spools are defined by the probing of field weld positions on the isometric drawing. SPOOLGEN then automatically produces the required number of spool isometrics for pipe fabrication

in the workshop and construction isometrics for pipe erection in the plant.

Piping data is typically delivered from the engineering contractor to the pipe fabricator via IDF or PCF files. Using SPOOLGEN ensures data consistency with the original design of the piping system. This accurate flow of electronic data significantly reduces the chances of piping data errors, and their associated expensive and time-consuming re-work costs.

→ ISOGEN®

ISOGEN is the industry standard for the automatic production of piping isometrics and bills of materials, with more than 50,000 users worldwide. It is the core technology underlying Intergraph's popular suite of piping software solutions for the plant life cycle. ISOGEN is highly configurable and the most automated engine available for drawing production.

ISOGEN offers total automation of piping isometric drawing production. More than 80 percent of all the electronic isometric drawings generated globally on a daily basis are produced by ISOGEN.

Eliminating the need to manually edit isometric drawings significantly reduces fabrication and on-site construction errors. Consistent drawing content is provided through isometric repeatability which ensures the same number of drawings, basic content, and spool and weld numbers following pipe design changes remain accurate.



→ SmartPlant Layout

SmartPlant Layout is Intergraph's new solution for preliminary 3D plant layout, including proposal development, early design estimates, and plant layout optimization. Based on Intergraph's next-generation 3D design solution, SmartPlant 3D, SmartPlant Layout is a standalone product providing automatic pipe routing, layout case management, and cost estimation.

SmartPlant Layout enables preliminary designs to be reused by carrying forward initial layouts into detailed design without additional remodeling – saving time and improving design quality. Because SmartPlant Layout is built on SmartPlant 3D architecture, software administrative burden

is significantly reduced in comparison to using standalone early design software.

SmartPlant Layout streamlines the preliminary layout design process. The interface is simple to learn and use – all application commands are available in a single, consistent environment. The resulting plant layout workflow has been optimized to ensure that high-quality layout options are achieved with minimal design modifications by the designer.

→ FrameWorks® Plus

FrameWorks® Plus, a PDS module, is a powerful, easy-to-use 2D/3D structural modeling and drafting program that supports drawing, modeling, analysis, and reporting. Because it integrates with third-party analytical and steel detailing software, as well as with other Intergraph plant design software, it supports all parts of the structural engineering workflow. This enables an entirely digital workflow, from conceptual modeling through site erection.

FrameWorks Plus adds value to the modeling process with commands and capabilities that integrate structural tasks with the plant creation process.

For analysis and design, the FrameWorks Plus module is a full-featured 3D structural modeler and analysis preprocessor. For connection design, fabrication, and detailing, the FrameWorks Plus module supports two-way data exchange with Design Data SDS/2, for which Intergraph is a reseller. To support the offshore oil and gas industry, FrameWorks Plus makes structural modeling and construction of platforms much easier.

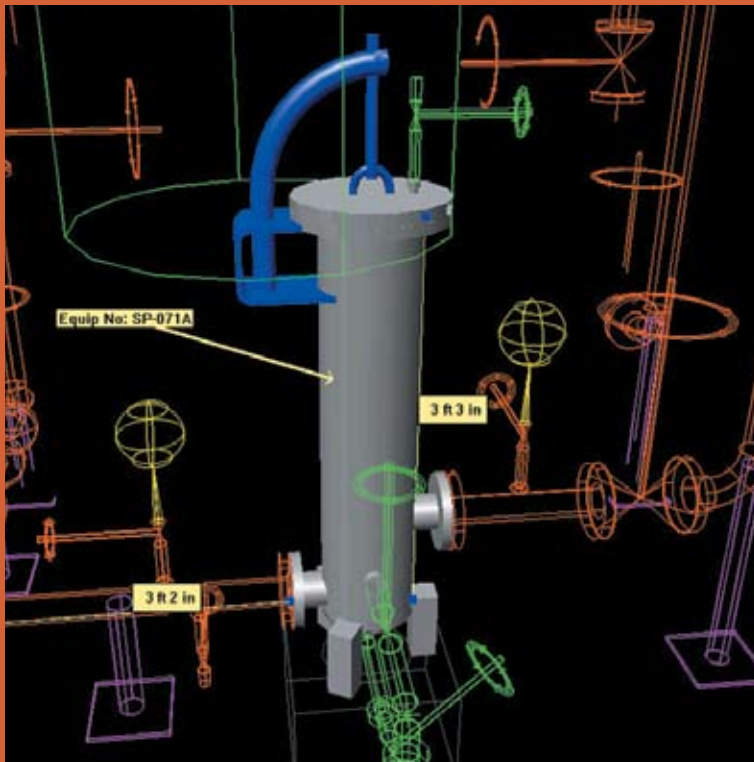
→ SmartPlant Review

SmartPlant Review is an extensive visualization environment for interactively reviewing large, complex 3D models. SmartPlant Review allows 3D model and in-depth data navigation for design, construction, and maintenance.

SmartPlant Review includes superior rendering and shading performance, customizable screen setup, dynamic navigation control with mouse or joystick, and other innovative features that aid in communicating your design to clients, project members, and managers.

SmartPlant Review provides a base product loaded with functionality that can then be modularized to add the specific functionality you need. Modules include:

- API Module
- Collaboration Module
- Construction Module
- On-site Drawing Generation Module
- Photo-realism Module
- Point Cloud Integrator Module
- Simulation & Visual Effects Module



SmartPlant Review Publisher adds versatility to SmartPlant Review by offering file compression and publication functionality. SmartPlant Review is not a prerequisite for this product. However, SmartPlant Review is required to view the published project files.

Information Management

Intergraph's Information Management solution offers a comprehensive, electronic approach to the validation, consolidation, integration, sharing, storage, and management of engineering information throughout the asset's life cycle, from plant concept and design through to operations, maintenance, and decommissioning.

Information Management applications ensure that engineering information is consistently and highly accurate on three fronts: the physical asset (what is there); logical and functional information (what was designed to be there); and regulatory and safety imperatives (what is required to be there). These are the pivotal tenets of engineering integrity.



→ SmartPlant Foundation

Intergraph's Information Management solution, SmartPlant Foundation, is the "e-Engineering Integration Hub" for the SmartPlant Enterprise. This collaborative conduit ensures that valid, consistent, and high-quality engineering data is shared between applications and users when and where they need it.

SmartPlant Foundation is multi-dimensional in its usage and deployment capabilities.

These include:

- Engineering handover
- Application integration
- "Engineering companion" between operations, maintenance, and ERP systems for decision support

- Client and regulatory remote review portal
- Document management and control, including lists and sheets management

The solution supports global collaboration between clients, contractors, and suppliers. It helps streamline business processes that share common information. These overarching and collaborative workflows through the internal and external value-chains deliver quality information to the desktop regardless of the source application; audit activities and signatories to ensure completion and support regulatory review; and enhance decisions with cross-discipline, cross-referenced data and indices.

“ We like SmartPlant Foundation because it is an integrated system that does not really distinguish between the different disciplines – it is really all one structure. We think of SmartPlant Foundation as a project tool that everyone on the project should be using. ”

Jacques Struwig, Murray & Roberts



Engineering & Schematics

Intergraph’s Engineering & Schematics solution covers the plant front-end and detailed schematics design for plant configuration, control systems, and power distribution. The solution is rule- and specification-driven to ensure data quality and consistency across the tasks, while improving design productivity. The design of the plant asset and its expansion and relationships through the design and operations phases form the heart of the solution.

Engineering disciplines are intelligent and fully integrated – an engineering change in one area automatically updates all associated objects, no matter where they are located, while the rule-driven environment prevents engineering errors. Integration with upstream and downstream design disciplines increases enterprise productivity even further, through the SmartPlant Enterprise.

OMV AG previously used various CAD systems to prepare P&IDs. Although this resulted in some increase in efficiency, up-to-date P&IDs were still not immediately available for use in plant modifications. But when they began using SmartPlant P&ID, engineer Albert Meyer and his staff saw a paradigm shift that, in his words, “best supported our goals.”

→ SmartPlant P&ID

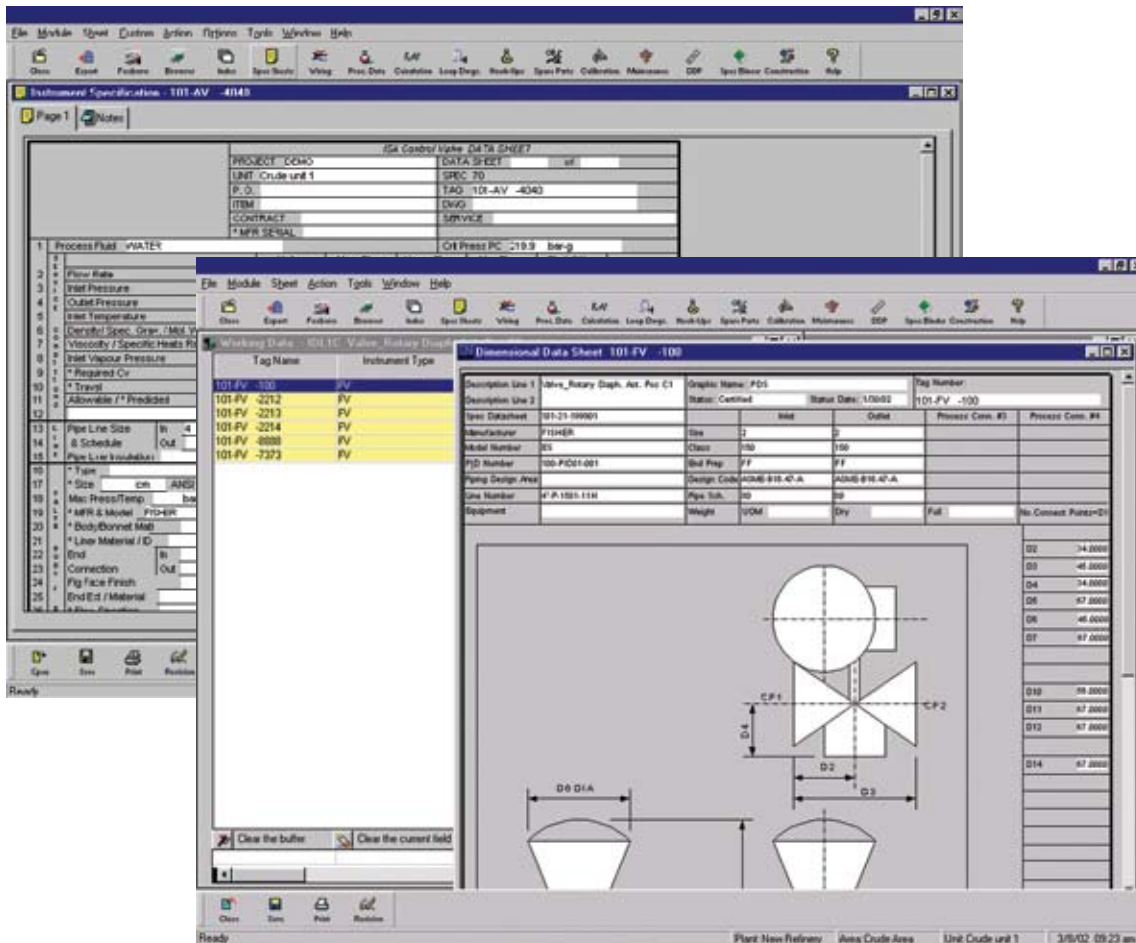
SmartPlant P&ID is a rule-based engineering solution for creating intelligent piping and instrumentation diagrams (P&IDs) while building a comprehensive data model.

SmartPlant P&ID provides global design and engineering capabilities through worksharing, a unique factor in the engineering application market, and integration with other design tools, such as SmartPlant Instrumentation, PDS, and SmartPlant 3D. An extensive reference library with rules, components, and their related engineering data is delivered with the product. SmartPlant P&ID also offers as-built functionality for O/Os and an

interface to SmartPlant Process Safety for HAZOP studies.

In addition, SmartPlant P&ID is standards-enabled, which means all of the various local engineering standards can be supported. With the user interface easily configured for operational use, SmartPlant P&ID display sets allow you to create graphical views of the P&ID from the database to support the operational tasks at hand, such as inspection, commissioning, maintenance, revamp, and more. SmartPlant P&ID is standardized on the ANSI system, with ISO, PIP, and DIN standards available in separate modules.





→ SmartPlant Instrumentation

SmartPlant Instrumentation is an instrument engineering application that enables you to design, manage, and maintain instruments across the complete plant life cycle. The software manages all phases of design, along with specialized modules for plant operations, construction, and commissioning.

Because all data is derived from the same source, SmartPlant Instrumentation provides consistency across tasks and deliverables. Capabilities include vivid visualization of design through standard reporting tools and easy data entry with tiled spreadsheets that provide views of multiple sheets. It also saves work hours by

eliminating duplicate data entry. SmartPlant Instrumentation delivers state-of-the-art functionality, such as support for fieldbus design with parameter rule checking.

The power of SmartPlant Instrumentation is in its extensive functionality, which covers the complete scope of instrumentation. SmartPlant Instrumentation is number one in the market for engineering tasks that include the design of a fieldbus control system. Plus, the product offers interfaces with leading DCS vendors.

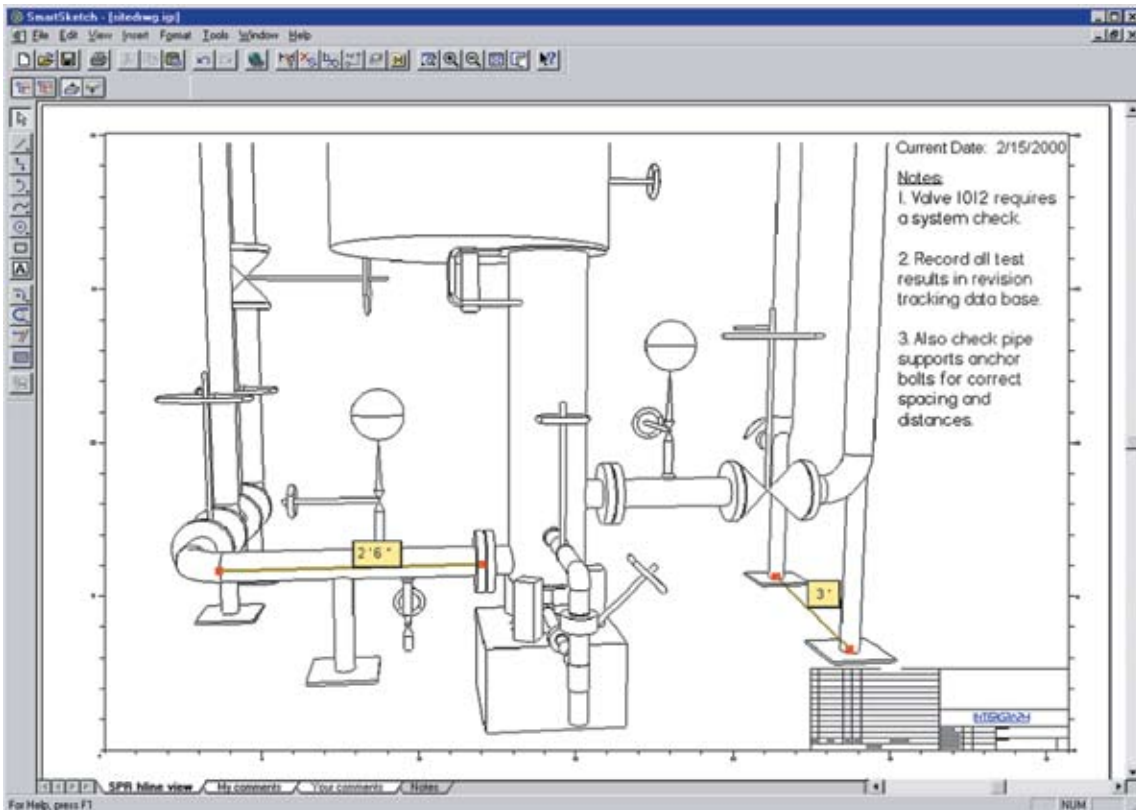
→ SmartSketch®

SmartSketch® is a complementary 2D drawing extension to your Intergraph engineering solutions. Take advantage of the software's automation, relationships, and parametric designs. SmartSketch can help throughout the design and operations life cycle, beginning with the conceptual phase. For example, preliminary P&IDs can be imported into SmartPlant P&ID for intelligent P&ID creation. As an add-on to SmartPlant Instrumentation, SmartSketch can be the drawing mechanism for loop diagrams, hook-ups, and other instrument configurations.

SmartSketch functions as a drawing editor for SmartPlant 3D and PDS, and can be used along with SmartPlant Electrical for creating

symbols, drawing borders, and many other tasks. SmartSketch can also stand alone and plug in to your specific work processes with not only other Intergraph products, but with third-party and in-house engineering applications as well.

Drawing production can be automated through the software's relationship and parametric capabilities. SmartSketch can function as your single drafting tool while importing and exporting traditional CAD formats. This reduces the cost of software tools and training. Because SmartSketch is OLE-compliant, you can easily combine Microsoft® Word or Excel files into your drawings for maintenance and commissioning tasks.



→ SmartPlant Process Safety

SmartPlant Process Safety is next-generation software which streamlines process safety review, leading to considerable benefits for capital projects and your operating plant. By automatically identifying hazards from the plant's schematic drawings, SmartPlant Process Safety enables companies to:

- Produce consistent, high-quality HAZOP study reports for much less time and cost
- Identify and eliminate hazards early in the design process, before change becomes limited and expensive

- Quickly and easily assess the effect of change on the safety of the entire plant

For capital projects, SmartPlant Process Safety leads to lower risk, improved design quality, and reduced schedules. For the operating plant, it means better, safer Management of Change (MOC) processes and much faster re-HAZOPs.

Powered by HAZID, SmartPlant Process Safety is an integral part of Intergraph's world-leading SmartPlant Enterprise.

→ SmartPlant Electrical

SmartPlant Electrical provides a strong common platform for both EPCs and O/Os to address their distinct and mutual electrical engineering and design needs. SmartPlant Electrical brings you accuracy and efficiency through automation and standardization, resulting in a safe and reliable power distribution network. SmartPlant Electrical supports the digital enterprise by creating and managing the electrical distribution system, from concept through design to operations and maintenance, to improve productivity.

Engineering benefits include:

- Better use of resources such as power distribution, panels, MCCs, and cables
- Automatic creation of deliverables
- Better load and network management
- Integration with other related Intergraph and third-party software
- Application of standards and rules that enhance yet control design implementation and modification

All of this results in accurate, reliable data for handover to the O/O. Electrical data management with SmartPlant Electrical reduces the cost of data upkeep, while sustaining safety at maximum levels.



“ Using SmartPlant Electrical allows Foster Wheeler to continue delivering quality products to our clients while reducing our cost and improving our schedules. After a few projects, we will have a large library of data and graphics to draw from; this will increase our consistency and accuracy and we will have better quality deliverables. We will also be able to adjust this data to meet our clients’ specifications in a timelier manner. ”

Dan Zubrick and Christopher Brallier, Foster Wheeler



Materials Management & Project Controls

Intergraph's Materials Management & Project Controls solution provides efficient and accurate project cost/performance and material control for plant owner/operators and EPCs. Wider use by partners is made possible by the solution's Web-enabled capabilities.

The solution combines better estimating; detailed tracking of material and costs; and smarter, budget-driven purchasing to ensure "right price, right time, right place" on-site delivery of materials. It enables effective construction planning by identifying a continuous material status, such as purchasing, shipping, and arrival-on-site dates. It supports collaboration between all disciplines and partners, such as the client, suppliers, freight forwarders, and subcontractors.

Materials Management & Project Controls applications lower engineering, procurement, and construction labor costs; reduce material surpluses and shortages; integrate engineering with corporate enterprise resource planning (ERP); and reduce lump-sum turnkey and other project risk.

“ Our goal was to retool engineering work processes and integrate a new set of commercial-off-the-shelf (COTS) software to assist us in improving our business productivity for a global competitive advantage. ”

Jere Schneck, Air Products

→ SmartPlant Materials, powered by MARIAN®

The modular and architecturally open SmartPlant Materials is the market-leading solution for integrated materials management in plant design, revamp operations, and maintenance projects, helping you:

- Reduce direct material cost
- Avoid material shortages and delays
- Reduce labor in engineering, procurement, logistics, and construction
- Significantly improve risk management

SmartPlant Materials ideally manages and controls all relevant business processes concerning materials management and controls in greenfield and brownfield projects.

The industry-specific business processes and workflows include the definition and maintenance of engineering standards, change control, and management of all quantities during engineering, procurement (also via the Web), and materials tracking. Finally, SmartPlant Materials offers the most accurate construction simulation and planning tools on the market, based on forecasted material availability.

SmartPlant Materials easily integrates with the SmartPlant Enterprise as well as other industry design tools. SmartPlant Materials also complements existing ERP systems with the required – highly industry-specific – functions and work processes.



At its main engineering centers in Allentown, Pennsylvania U.S. and Hershaw, U.K., Air Products successfully implemented the SmartPlant Enterprise, including SmartPlant Instrumentation, SmartPlant P&ID, PDS, and SmartPlant Materials.



Global Industry Alliances

Intergraph offers a successful alliance approach that combines engineering software development know-how from Intergraph, complementary software from other industry vendors, and engineering expertise from clients to deliver a truly effective, integrated solution for the process, power, and marine industries.

→ SmartPlant Alliance Program

The primary goal of the SmartPlant Alliance Program is to increase the value of SmartPlant Enterprise for our clients by growing into neighboring and complementary business areas.

Benefiting from SmartPlant Enterprise's open architecture, the SmartPlant Alliance Program encourages complementary solution providers to offer more extensive and valuable solutions for SmartPlant Enterprise clients.

SmartPlant Alliance members can leverage the strong value proposition of SmartPlant Enterprise for their own business. There are three types of SmartPlant Alliance members:

- **SmartPlant Alliance Technology members** – Software and solution providers who integrate their products with SmartPlant Enterprise technology
- **SmartPlant Alliance Services members** – Consultants and service providers who offer service-centric solutions around SmartPlant Enterprise

- **SmartPlant Alliance Content members** – Companies who develop content for SmartPlant Enterprise products – for example, suppliers provide their electronic catalogs in a SmartPlant Enterprise-readable format



“ Fluor sees significant potential in SmartPlant Enterprise to provide improvements in data integration. Our investment in this execution platform is a key part of Fluor’s strategy to maintain industry leadership in improving execution excellence through the use of specific technologies. ”

Glenn Gilkey
Vice President, Project Execution Services
Fluor Corporation

About Us

Intergraph Corporation is the leading global provider of spatial information management (SIM) software. Security organizations, businesses, and governments in more than 60 countries rely on the company's spatial technology and services to make better and faster operational decisions. Intergraph's customers organize vast amounts of complex data into understandable visual representations, creating intelligent maps, managing assets, building and operating better plants and ships, and protecting critical infrastructure and millions of people around the world.

For more information, visit www.intergraph.com.





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