SMARTPLANT ENTERPRISE
FOR OWNER OPERATORS
Leveraging the Engineering Design Basis Across the Plant Life Cycle
BUSINESS CASE

Owner operators face unprecedented demands to:
• Deliver new plants and major expansions of existing facilities more rapidly while utilizing finite resources
• Maintain the highest levels of health, safety, and environmental protection
• Deliver projects on schedule and within rigid budget constraints
• Manage time-to-market and deliver a high-quality product in a competitive environment
• Create facilities flexible enough to meet market demands in production and product offerings
• Avoid adversely impacting the functionality and production of the existing plant while undertaking complex plant modifications
• Maintain safe, predictable production levels from existing plants, at the lowest sustainable cost
• Demonstrate to regulatory authorities the integrity of plant-maintained information
• Provide assurance that the owner operator’s “virtual plant,” in-plant documentation, and IT systems are consistent with the current physical state of the plant in operation
• Demonstrate that a controlled management of change (MOC) process with auditable traceability is enforced within plant operations
• Retain plant knowledge and experience in the face of increasing rates of workforce retirement
One barrier owner operators face in meeting all of these challenges is interoperability. Interoperability can be defined as the ability to manage and communicate electronic product and project data between collaborating firms and within an individual company’s design, construction, maintenance, and business process systems.

The National Institute of Standards and Technology (NIST) report\(^1\), which examined the cost of inadequate interoperability in the U.S. capital facilities industry alone, estimated the cost of poor interoperability across the complete design, build, and operate supply chain to be US$15.8 billion annually for a total capital expenditure of US$374 billion, or a loss of 4.2 percent of the installed cost.

Two-thirds of this loss is estimated to be borne by owner operators and represents a 2.8 percent ongoing loss on Return on Capital Invested (ROCI). For a large refinery, this represents a loss of millions of dollars each year.

Owner operators must find a way to address these interoperability issues, while focusing on their core businesses of exploration and production. Intergraph® SmartPlant® Enterprise for Owner Operators has been designed to help owner operators address the issue of interoperability by providing prepackaged solutions that can be rapidly rolled out, incorporating customer-specific requirements at low risk.

**Key Features**

- Rapid, low-risk implementation ensured by leveraging industry-leading, proven Intergraph Smart Technology tools and out-of-the-box preconfigured, best-practice solutions for key owner operator work processes
- Flexibility to rapidly incorporate customer-specific requirements within predefined work processes
- Synchronization of information with maintenance, reliability, and other operations’ systems to reflect changes to the dynamic plant design basis
- Reduced training needs, discovery time, and better decision-making supported through the universal, user-friendly, role-based Web portal, providing seamless access to data and documentation
- Flexible platform for third-party and legacy tool integration
- Simple access to data through filtered queries and 2D/3D graphical user interface
- Traceability and auditability for key owner operator work processes, such as management of change, equipment inspection, etc.
- Secure, controlled management of data hand-over from projects and brownfield data take-on using a staging area for the validation, transformation, and loading of operations’ systems
- Support for periodic, incremental handover of data and documentation between SmartPlant Foundation-based systems
- Management of key project execution work processes, such as MOC for projects, interface management, non-conformity/waiver management, and technical query management

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YOUR SOLUTION FOR MANAGING THE ENGINEERING DESIGN BASIS

Throughout the years, many leading owner operators have chosen Intergraph’s industry-leading SmartPlant Enterprise integrated suite of tools to manage their dynamic engineering design basis. Building on this success, Intergraph provides SmartPlant Enterprise for Owner Operators, offering preconfigured work processes covering the complete plant life cycle, interoperability with maintenance and other operations’ systems, and a common Web portal designed for owner operators.

Powered by Leading Integration Technologies

SmartPlant Enterprise for Owner Operators leverages leading integration technologies such as SAP® NetWeaver® and Microsoft® SharePoint®. These technologies power the synchronization of data between the engineering design basis and other operations’ systems, including legacy systems, and provide the role-based Web portal.

Managing Change to Ensure Consistency with ERP and Other Operations’ Systems

SmartPlant Enterprise for Owner Operators offers interoperability between SmartPlant Enterprise and other operations’ enterprise systems. This ensures that information in enterprise resource planning (ERP), reliability, process safety, digital control systems, and more is maintained to reflect change in the dynamic engineering design basis. Information will be presented to the user via a common, role-based Web portal. This portal will filter and structure search results based upon user role and privileges, reducing discovery time and leading to better, faster decision-making.
Supporting Engineering and Managing Project Execution

During the plant design, construction, and completion/startup phase of greenfield or brownfield projects, SmartPlant Enterprise for Owner Operators provides preconfigured processes to support engineering and project execution work processes. These include document and data interdisciplinary review, management of project change, interface management, non-conformities/waiver management, technical queries, and more. These processes are suitable for both CAPEX projects and turnaround projects.

These processes provide for complete auditable traceability and provide a management overview of the status of these processes on projects, enabling CAPEX cost reductions and shorter project schedules.

A secure Web portal promotes easy access to the “single source of truth,” where information and documentation from across the project are assembled in a common, globally accessible repository, eliminating the need for traditional document and data distribution.

Common Plant-centric Data Model for Low-risk, Rapid Implementation

SmartPlant Enterprise for Owner Operators (SPO) is built on Intergraph’s proven, industry-leading, multi-discipline toolset.

The SPO Core Solution includes a site license for SmartPlant Foundation, SmartPlant Reference Data, SmartPlant Isometrics, and SmartSketch®. Other integrated SmartPlant Enterprise tools such as SmartPlant 3D, SmartMarine® 3D, SmartPlant Instrumentation, SmartPlant Electrical, and SmartPlant P&ID are licensed separately and can be included as required. These tools are integrated around a common, plant-centric data model and integration hub, ensuring data consistency between tools and facilitating low-risk, rapid implementation.

Project Data Handover and Brownfield Data Take-on

The handover of data from CAPEX projects and plant turnarounds is a formidable task. It can involve the transfer of thousands of documents and millions of individual data items. The handover of a $1 billion CAPEX project can cost more than $15 million and take more than a year.

SmartPlant Enterprise for Owner Operators (SPO) provides two complementary solutions that address different aspects of the handover and take-on of data and documentation. These solutions can both be included in a comprehensive information handover strategy to reduce the cost and effort of data take-on:

• The SPO Validation, Transformation, and Loading (VTL) Solution is focused on managing the verification and take-on of data derived from non-SmartPlant Enterprise tools, such as Microsoft Excel® lists.
• The SPO Handover Solution manages the transfer of data and documentation from SmartPlant Foundation-based systems

VTL
The SPO VTL Solution manages:
• Handover and verification of data submitted from contractors and suppliers on projects
• Verification of information from legacy systems or from scanning document files as part of brownfield data take-on

Data is imported into a staging area where it is held in quarantine prior to validation. Many different types of validation rules may be easily configured in the solution to verify certain conditions exist, such as:
• Naming rules have been followed
• Values are within pre-defined ranges
• Units of measure are valid
• Mandatory data is present
• Relationships exist and are valid

You can also define more complex business rules and compare data in the staging area with data already loaded into the target SmartPlant Foundation system as part of validation routines. Validation rules may be run on data submitted and a complete history of which checks have been performed by whom, when, and the results are held in the system. You can selectively export and load data from the staging area into target systems. These can be Intergraph or third-party systems.

The VTL Solution enables improved management of the take-on of data from projects and brownfield facilities, reduces the time and effort needed for verification, and ensures a higher level of data quality.

SmartPlant Enterprise for Owner Operators supports SAP NetWeaver and integration with SAP Service and Asset Management. SmartPlant Enterprise for Owner Operators exploits the power of the SAP NetWeaver platform to help ensure data synchronization and interoperability between Intergraph’s industry-leading plant engineering automation suite and the enterprise asset management capabilities of the SAP Service and Asset Management solution. SmartPlant Enterprise used with SAP Service and Asset Management (through integration with SAP ERP) helps ensure synchronization between the plant engineering and plant maintenance environments, employing best-practice work processes for plant management of change.

The solution integrates with the SAP NetWeaver Process Integration (SAP NetWeaver PI) component of the SAP NetWeaver platform. It exchanges critical data with instances of the SAP Business Suite family of solutions, and is integrated successfully with business functions exposed through the SAP NetWeaver Portal.
# SMARTPLANT ENTERPRISE FOR OWNER OPERATORS

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<th>SOLUTION</th>
<th>BUSINESS PACKAGES AND WORK PROCESSES INCLUDED</th>
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<td>SPO Core</td>
<td>• Plant breakdown structure and work breakdown structure management  &lt;br&gt; • Document management  &lt;br&gt; • Transmittals  &lt;br&gt; • Tag management  &lt;br&gt; • Work package management  &lt;br&gt; • Plant data loading  &lt;br&gt; • Engineering data browsing  &lt;br&gt; • On-plant engineering design  &lt;br&gt; • Conceptual engineering</td>
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<td>SPO Operating Plant</td>
<td>• Management of change for operations  &lt;br&gt; • Synchronization of changes in the dynamic design basis with the plant maintenance system  &lt;br&gt; • Inspection Assistant  &lt;br&gt; • Interface management</td>
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<td>SPO Project Execution</td>
<td>• Management of project change  &lt;br&gt; • Non-conformity (waiver) management  &lt;br&gt; • Technical query and site queries  &lt;br&gt; • Interface management</td>
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<tr>
<td>SPO Validation, Transformation, and Loading</td>
<td>• Import of data submissions to staging area  &lt;br&gt; • Definition of validation rules  &lt;br&gt; • Execution of validation jobs  &lt;br&gt; • Reporting of validation results  &lt;br&gt; • Data filtering, export, and loading to target systems</td>
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<td>SPO Handover</td>
<td>• Periodic, incremental handover  &lt;br&gt; • Handover of published and interactively-created data and documents  &lt;br&gt; • Complete graphical navigation support on the target system  &lt;br&gt; • Full traceability as to what data has been handed over to who and when</td>
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HANOVER
The SPO Handover Solution enables the handover of information between two or more SmartPlant Foundation-based systems. Packages of information and documentation can be handed over on a periodic, incremental basis between project stakeholders – for example, from an EPC contractor using SmartPlant Enterprise to an owner operator using SmartPlant Enterprise for Owner Operators.

The transfer of information preserves the inherent intelligence from the source system. For example, 3D models and P&IDs published from SmartPlant P&ID will retain their intelligent navigation when installed on the target system as if the data had been published locally. SmartPlant design tool databases can be moved from the source to the target system and re-registered against the target SmartPlant Foundation. The SPO Handover Solution simplifies a process that has previously been possible, but has required substantial services to achieve.

SOLUTIONS SUPPORT THE COMPLETE OWNER OPERATOR LIFE CYCLE
Each SmartPlant Enterprise for Owner Operators solution includes business packages that offer preconfigured owner operator work processes. These business packages offer a 60- to 80-percent fit for most owner operators. We can easily and rapidly adjust the work processes to meet your specific needs.

“SmartPlant Enterprise for Owner Operators is designed to enable asset owners to fully exploit this engineering design data to manage asset performance and give them a means to ensure proper maintenance of information integrity across the owner operator system landscape.”

Sid Snitkin, Ph.D.
Vice President and General Manager
Enterprise Advisory Services
ARC Advisory Group
ABOUT INTERGRAPH

Intergraph is the leading global provider of engineering and geospatial software that enables customers to visualize complex data. Businesses and governments in more than 60 countries rely on Intergraph’s industry-specific software to organize vast amounts of data to make processes and infrastructure better, safer, and smarter. The company’s software and services empower customers to build and operate more efficient plants and ships, create intelligent maps, and protect critical infrastructure and millions of people around the world.

Intergraph operates through two divisions: Process, Power & Marine (PP&M) and Security, Government & Infrastructure (SG&I). Intergraph PP&M provides enterprise engineering software for the design, construction, operation, and data management of plants, ships, and offshore facilities. Intergraph SG&I provides geospatially powered solutions to the public safety and security, defense and intelligence, government, transportation, photogrammetry, and utilities and communications industries. Intergraph Government Solutions (IGS) is an independent subsidiary for SG&I’s U.S. federal and classified business.

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