



**Plant Information Management in Åsgard Offshore Project**  
an  
**e-Engineering / e-Business implementation**

*A Plant Information Management (PIM) Solution*

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## 1. Introduction

Åsgard/Statoil and Intergraph have established a close e-Engineering business partnership. e-Engineering addresses access, management and administration of technical plant information in all main work processes in development projects, and on into operations. This partnership formed a joint integrated e-Engineering team to drive the successful development and implementation of a web enabled, standards based Plant Information Management (PIM) data warehouse to hold all technical as built data for the Åsgard Offshore Project. This data warehouse is based on Intergraph's Notia solution which comprises a managed repository for plant information and an extensive portfolio of e-Engineering applications for creation, browsing and maintenance of plant information. Successful e-Business also relies on this managed and controlled plant information.

Both the Norsok standards organisation and the Åsgard project experience highlights e-Engineering's huge potential for cost reduction of more than 30% in future development projects. Major benefits in the current investment made in a PIM data warehouse have already been experienced during the Åsgard B project phase. This has been achieved by the implementation of e-Engineering applications and the associated improved business processes. The objective to gain an investment payback in 2 years has been exceeded. Further major benefits from the PIM data warehouse lie in the future—during the 30 year Åsgard plant operation and maintenance phase.

These achievements represent a world-class, quantum leap in plant information management. They have been accomplished by the merging of Statoil's oil and gas engineering domain expertise with Intergraph's engineering focus and software delivery capability. The building of close relations with the main contractor, Kværner Oil & Gas, has also been central to enable the introduction of new applications and improved work processes during the project.

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## 2. Background on Statoil and the Åsgard oil & gas field development

Statoil is the state-owned Oil and Gas Company in Norway. It has 17,000 employees, annual revenues of US\$14 billion, and operations in 23 countries. It operates more than 20 on/offshore installations in the North Sea.

Åsgard ranks as the largest subsea development in the world. The Oil & Gas Journal described it as the most daring and complex subsea project ever launched. The Åsgard development located 200 km off the coast of mid-Norway is one of the largest and most complex offshore oil/gas developments on the Norwegian continental shelf. A total of NOK 33 billion (US \$4.4 billion) is being invested in production facilities, wells and sub sea installations.

The Åsgard development consists of :

- Åsgard A, an oil production ship that came on stream in mid-1999;
- Åsgard B, the world's largest floating gas platform which is due to begin operations in October 2000 designed to produce 12 billion cubic metres of gas per year, much of which will be piped direct to continental Europe;
- Åsgard C the storage vessel for condensate from Åsgard B;
- Sixteen sub-sea templates.

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### 3. Åsgard/Statoil's objectives for the PIM Data warehouse

The equipment and materials required to build huge and complex offshore facilities such as Åsgard come from many suppliers and contractors around the world. Thousands of people from many organizations and disciplines participate. A successful project depends to a large degree on the effective accumulation, communication and management of plant information. 80% of this is technical plant information. Equipment suppliers and contractors create most of the information early in project development. As the field owner-operator, Statoil's task is to capture all the as-built plant information in a form suitable for re-use during plant commissioning, operations and maintenance. This information also comprises an invaluable intellectual resource for future developments in Statoil.

Relevant business drivers for Statoil are:

- Shorten the time to first oil and gas production
- Introduce improved, integrated work processes across the value chain by implementing e-Engineering applications via a common web portal on the corporate Intranet and the Internet.
- Increase the operating efficiency of the plant
- Maintain operating licences, safe operation and Health and Safety Executive (HSE) compliance
- Shorten plant shutdowns for planned maintenance; reduce unplanned shutdowns, maintenance overruns and repair costs
- Reduce the spare equipment inventory
- Reduce plant information hand-over costs from contractors and suppliers; receive consistent as-built plant information in good time for commissioning and operations
- Assure data longevity and re-use of information over the whole plant life cycle.
- Integrate technical plant information with other business systems to provide common e-Business solutions.

To further these business aims, Åsgard/Statoil decided it needed a single integrated solution for sharing and exchanging all plant information.

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### 4. Phased PIM Implementation strategy

During 1996, Statoil mounted a study of the business benefits that a standards based PIM data warehouse would deliver. The investment appeared attractive. Indeed, the company expected its investment to payback in less than 2 years.

The Åsgard PIM project started in January 1997. As the design of the Åsgard A ship was already too far advanced, Åsgard/Statoil's first target was the Åsgard B gas platform. The initial emphasis was to be on equipment information. Given the incomplete status of the available standards at this time and technological challenges related to delivering a satisfactory implementation the decision to implement the Åsgard PIM data warehouse was a bold and visionary step made by Odd Mosbergvik the Åsgard Director. It resulted in the first operational data warehouse based on the POSC/Caesar (ISO 15926) standard product data model.

The PIM data warehouse project was initiated with the mandate to gain concrete business benefits in Åsgard from implementing a data warehouse based on an industry standard product model. Bjørn Henrik Magnus was appointed PIM project manager. The solutions developed were to provide the basis for the next generation of plant information management systems for Åsgard operations, and replace the existing portfolio of plant information systems in Statoil.

During early 1997 Statoil collaborated with Norsk Hydro and Saga Petroleum in a Joint Industry Take-up Project. The objective was to acquire suitable software for the POSC/Caesar based data warehouse. The take-up project on behalf of these three oil companies contracted Intergraph to develop and supply its Notia software for this purpose. Intergraph successfully delivered Notia on target and within a fixed price by the contract date in August 1997. At this stage Notia comprised a POSC/Caesar compliant repository without working applications.

## End user applications

The next stage was to load data and develop applications. An integrated team of Åsgard and Intergraph personnel was established to design and deliver end-user applications. The following major milestones were achieved in this phase extending from Q4 1997-Q1 1999:

- PIM in procurement, including administration of standard (catalogue) equipment data sheets and documentation
- PIM structure manager and tag manager
- PIM with 2D Browser and 3D web interface
- PIM document administration, including document index and electronic archive
- PIM Change Management

This phase was very successful. The applications were well received by the Åsgard B project and proved that stable, high-performance, intuitive, web-based applications could be delivered on top of a POSC/Caesar data warehouse via the corporate Intranet and the Internet.

## Commercial off the shelf software approach

The enormous potential value of the PIM data warehouse was already becoming clear by mid-1999. However, the initial applications were specific to Åsgard and more were needed. As Statoil wanted the software to be commercialised, it gave Intergraph ownership of the bespoke applications developed to date, and a US\$2m software and services contract in July 1999 to continue Notia development and to work in partnership with Åsgard/Statoil to develop commercial-off-the-shelf (COTS) software modules. As well as the enhancement and productisation of existing Åsgard-specific modules, Intergraph is to create additional PIM/Notia modules. These include:

- An enhanced web interface (including use of XML) to provide extensive data creation and manipulation facilities
- Engineering numbering, including syntax control
- A module for Instrument Loops (field instrumentation, fire & gas and telecom)
- A module for managing Electrical Distribution Networks
- Bi-directional integration with SAP R/3 and Statoil's in-house Piping Inspection System
- Document Management

Important technical features of this productisation phase are the migration of the PIM/Notia data model to ISO15926, exploiting the object orientated features of this database. This environment will simplify the work of application developers as it provides an interface to applications at a higher abstraction level, shielding them from the current complexity of the underlying POSC/Caesar product model.

Rollout of PIM for use during operations starts in October 2000. The seamless hand-over of as-built plant information - as simple as switching on access rights to relevant user-groups - will be complete by that time. The use of PIM will expand rapidly across Statoil's operations staff, as well as among external equipment suppliers and contractors. Statoil has plans to start using the Åsgard PIM solution as best practice in its other future projects.

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## 5. Achievements at the Millennium Start

Statoil's Bjørn Henrik Magnus, Åsgard PIM Project Manager stated:

*"Our original objective was to implement an Åsgard PIM data warehouse based on an industry standard product model for as-built plant information for Åsgard B, concentrating on equipment data. We have managed to do much more than that, and have so far expanded the PIM functionality more than three times, with the same budget. The objective to gain an investment payback in 2 years has been exceeded. PIM has become our integrated solution for ALL plant information and will replace our existing portfolio of systems for maintaining plant information."*

The PIM project major benefits areas have so far been:

- PIM in procurement administration, focused on standard equipment information
- PIM in engineering change management
- PIM in plant commissioning

The work has proved the solution based on POSC/Caesar is effective for taking on and maintaining the huge volume of as-built plant information that characterise offshore developments. The partnering of Statoil, with its plant and business expertise and Intergraph, with its engineering focus, software development and services teams is delivering a focused practical solution and real benefits.

PIM has all plant information and documentation for Åsgard B validated and loaded, and will also include all plant information for the other Åsgard field installations. The PIM solution is now regarded as being "mission critical" to the Åsgard development with over 500 users, 40-60 normally working concurrently.

PIM includes:

- 3500 changes (DCN's/DCR's),
- 120,000 tags,
- 305 manufacturers, 3000 models/types,
- 60,000 documents/drawings etc.

Åsgard now has experience of a full scale PIM implementation. The response from PIM/Notia is now very fast, for example, a complete equipment data sheet is created on the fly in less than one second.

PIM users are mainly discipline engineers working for the main contractor, Kvaerner Oil & Gas, at two sites in Norway, other EPC contractor personnel throughout Europe and Statoil's own engineers preparing for operations start-up. Usage also includes equipment suppliers. Åsgard/Statoil expects the number of users to escalate to over 3000 users in the corporate rollout phase.

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## 6. The Industry Standard's based Data Management Core

The data management core of Åsgard/Statoil's PIM data warehouse is Notia, Intergraph's Data Warehouse Solution. This adopts a standard format for data representation to facilitate exchanging and sharing information among applications. Notia is today based on an early release of the POSC/Caesar (P/C) product model and will be migrated to the EPISTLE Core Model as an implementation of the ISO 15926 P/C standard for plant information. It embodies the neutrality, openness and longevity inherent in STEP-based technologies and is a mechanism capable of describing plant data that is independent of any particular authoring/ creation system.

The P/C model holds data in a highly normalised form as numerous data objects. These are linked by a multitude of relationships. It is the extensible P/C Reference Data Library (RDL) that gives meaning to the generic model and ensures it can be used for practical application in the oil/gas industry. When populated

with the data that describes all the materials, equipment and activities associated with Åsgard B, PIM/Notia becomes a data warehouse and single source of information usable throughout the plant life cycle by all authorised participants. In Notia, the data model has been de-normalised to some extent to provide good system response within the technology available today.

Statoil found that loading plant data via STEP Part 21 files was inefficient. This problem was cured with Intergraph's help by developing a new data loading and exports module. With this Statoil cut the time for a typical loading operation from more than a week to one hour.

Data consistency and rule checking is essential. PIM has a separate QC module implemented externally as a staged data store, where information is assembled and subjected to quality checking. The checks are performed on a denormalised relational table structure before data is "exploded" into the P/C structure for PIM/Notia.

The PIM concept includes some Intergraph applications that today are not based on the Notia core data warehouse eg. INtools the Instrumentation and Loop System. They are however integrated into Notia, ensuring that the data is synchronised between Notia and the applications. Intergraph's development programme includes the migration of many of these applications to the Notia data model.

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## 7. e-Engineering Applications

A key element of the Notia data warehouse is the separation of plant information from the applications that browse or create/modify this data in the data warehouse. Use of the P/C ISO 15926 standard information makes this a practical proposition for information longevity through the long life of a plant. Statoil and Intergraph are jointly developing these COTS applications via an integrated team where Statoil has a leading role in specifying COTS application functionality.

The Statoil-Intergraph development plan is the blueprint for Intergraph's continuing strategy for partnering with customers to develop practical solutions that deliver real benefits for the Process Industries.

### PIM Web Interface

PIM/Notia user applications implemented for Åsgard are characterised by a consistent, intuitive web-based Graphical User Interface (GUI). A prime requirement for PIM applications has been the provision of a web-GUI. Developments such as Åsgard include contractors and suppliers around the world and the availability of a common PIM Web-Portal accessible via the corporate intranet, extranets and the Internet was established as an early prerequisite for PIM applications. Exploitation of the Internet and a common web-portal to plant information is the only viable prospect of introducing truly integrated work processes across the value-chain on a global scale in projects of the complexity of Åsgard. The web-paradigm offers users a familiar interface and has reduced training and support costs for PIM. This is especially important in locations where limited local support is available. Magnus warns that a good Web interface is not easy to achieve and there were difficult firewall and security issues to face.

Where non-Notia modules are being implemented as part of the overall PIM data warehouse information will be available for browsing in the Notia web-browser that will provide a common web-portal for all plant life-cycle information. As an interim measure for non-Notia modules MS-Windows based GUIs will be used to maintain data. Many of the non-Notia based modules will be gradually migrated over to the Notia ISO15926 core as a phased development programme and, in parallel, the web GUI will also be introduced for maintaining data in these modules.

## **PIM Procurement Management, including standard equipment information**

Traditionally, the management of information and documentation for manufacturers' standard equipment (equipment that can be ordered from a manufacturer's catalogue, e.g. instruments, lighting fittings, junction boxes, cables, electric motors, etc.) within the process industry has been poor.

Repeated submissions by suppliers result in re-entered datasheets, multiple copies of the same data, duplication of suppliers, non-standardisation of equipment variants and fragmentation of information. This wastes time and money throughout the value chain. For the plant owner it results in inconsistencies, errors, and an undesirably large inventory of equipment spares. Supplier user manuals received by operations are traditionally voluminous, of poor quality and impossible to maintain effectively.

Statoil's initial business objective for PIM was to concentrate on equipment data to cure these problems. The Standard Equipment application was rolled out in early 1998. Statoil arranged for a third party company, Tektonisk, to prepare data sheet information and to get it approved by equipment suppliers before loading into PIM. Framework agreements with suppliers are being modified to make suppliers directly responsible for maintaining the information in PIM via the Internet.

Notia has now become the common central repository for all standard equipment data and was their PIM "quick win".

Bjørn Henrik Magnus, points out

*" Suppliers now send their information to Statoil only once and it will be held once only. The volume of final documentation required in user manuals for plant operations has typically been reduced by more than 80% by stripping out standard equipment data and documentation and it is bringing large benefits to Procurement. This module will promote variant reductions, reduce equipment prices and at the same time will benefit the external contractors and equipment package suppliers by saving time in acquiring information and documentation from manufacturers."*

Data sheets, which can be formatted to Industry or ISO specifications, provide users with a 'virtual document' or a window onto the data contained in Notia ensuring the most up to date information is utilised.

This module is being configured to handle custom equipment in addition to standard equipment.

## **PIM Structure Manager & Tag and Asset Manager**

The plant breakdown structure is core to Notia functionality and includes:

- Drill-down navigation to tags and design documentation through the geographical breakdown of the plant by plant area and through the process system breakdown of the plant
- Presentation of tag index and process/mechanical data sheet information, lubrication and certification data.
- Drill-down tag hierarchies
- Link from tagged locations to installed equipment (assets) and standard equipment models and variants.
- Link of tags, assets, areas, systems etc. to relevant documentation

By use of the POSC/Caesar effectivity date the plant configuration at any past date may be viewed – useful for safety analyses, insurance claims etc.

## PIM Document Management

Notia is essentially a data-centric solution. In principle, when designers, constructors, plant operators or maintenance engineers need documents, these are generated "on-the-fly" as tabular or graphical reports by applications that draw relevant data from the data warehouse. However, the nature of the business today is that many conventional electronic documents are created during development projects and need to be maintained during operations. In PIM, Notia has been integrated with Intergraph's Document Management application, Directa.

Directa provides document security and access, revision control, check-in/out facilities, document transmittal functionality and facilities for users to subscribe to and be alerted to document updates through e-mail.

The PIM integration solution allows the meta-data regarding documents to be held in Notia, as well as the information regarding the structuring of complex documents such as supplier user manuals.

## PIM Change Management

The management of changes to plant configuration is essential to both effective working and the technical integrity of a facility and its related plant information. Effective change management is important through all phases of a facility's life cycle, but is most acute during the project development phase where thousands of changes need to be administered, hundreds of which may be "live" at any one time.

*On the importance of change management Bjorn Henrik Magnus commented:*

*"During detail plant design, 50% of the engineering work performed is the result of changes and this rises to 100% after the Approved for Construction milestone during the "Follow-on" engineering phase. Over 4000 changes have been registered for the Åsgard B project. Traditional, paper driven or simple electronic archive systems do not allow users to get a satisfactory overview of changes and their status and what "is in the pipeline", neither do they allow adequate traceability over what changes have affected plant items."*

Managing changes is always costly and time-consuming due to the complex interrelationships that exist between the affected plant items, the data and documents, and the work disciplines and companies. A further complexity is the "ripple" effect that one change has on others.

The PIM/Notia Change Manager tracks the details and status of each change, highlights plant items subject to ongoing change, provides an overview of all changes affecting a plant item and manages the workflow for all changes and mark-ups.

PIM/Notia Change Manager offers the benefits of an improved overview of changes and their status, simplified handling of changes, improved planning of change implementation, reduced costs and improved traceability of changes.

*Bjørn Henrik Magnus continued*

*" It previously cost Statoil between US\$500-1000 to revise a single drawing with Change Manager the company has reduced this cost to 10% - US\$50-100. It improves the change impact planning and change implementation, with consequent lower costs. The big advantage is that it provides management with an improved overview of changes and their status. The savings in this area alone would justify the system expenditure for PIM."*

## **PIM 2D Graphical Interface and 3D Interface**

PFDs and P&IDs are the key documents for every process plant. Normally these are 2D schematics with a multitude of implied references to other data and documents, and to the plant configuration. In the PIM solution, these have become "intelligent" documents, providing valuable interfaces to the plant data warehouse. The solution implemented was initially focused at integrating P&ID drawings with the data warehouse, but it is generic and capable of supporting any drawing type. It therefore allows the intelligent integration of any 2D drawing with PIM, irrespective of which of the project's CAD tools were used to create it.

Engineers browse a schematic on their screen, point to any item or tag, and all the underlying data and menu options become available. The hyperlinks are generated automatically by software that scans the basic 2D schematic. This recognises tag numbers and document numbers, which become the links to the data within PIM. If a drawing is changed, it is automatically re-scanned to update all the links.

The 3D interface is similar. It provides the links between items in the 3D plant model—created in Intergraph's PDS or other CAD system—and the underlying PIM data. A third party product has been implemented that has the benefit of providing streaming of 3D models over Intranets/Internet. This means a single copy of the visualisation model can be held in the data warehouse that can be made available globally across the project. Models are viewed in a web browser frame and clicking on an object sends a query to PIM to retrieve data and menu options. Similarly, for tags located in the data warehouse the 3D model can be retrieved in the browser.

This solution offers the benefit of interoperability, handling all 3D model types encountered in Åsgard: including Intergraph's PDS Design Review format and other third party CAD products. It allows all models, irrespective of their origin, to be viewed in a common browser integrated with the data held in the data warehouse.

This interface is particularly useful for planning changes, examining access to plant items, and for planning inspection and maintenance work. Traditionally it has been impractical for most plant owners to use a 3D-plant model, but this 3D Interface removes all obstacles.

## **PIM Integration with SAP and Statoil's Piping Inspection System**

While the PIM Notia-based data warehouse handles all technical information for the plant configuration, Statoil has adopted SAP to manage the financial and resource information for maintenance and materials management. These two critical information sources need to be linked, and Statoil and Intergraph are jointly developing a bi-directional interface. This will give PIM users direct access to SAP data, and vice versa. A SAP user who needs direct access to technical information for tags or equipment identified in the SAP material master will be able to start PIM from SAP and retrieve data for the plant item. An engineer using PIM could get details of the repairs and maintenance programme held in SAP for a tag or equipment serial number. Similarly, an engineer can find details of equipment identified in PIM but which is currently in the repair shop or stockyard rather than in the tagged location. A PIM user may also co-ordinate the closeout of a work order for repairs or changes that requires the update of the technical information.

A bi-directional interface is also being implemented to Statoil's propriety Piping Inspection System.

## **PIM Instrument Loop Administration**

Loop configuration includes control instrumentation, fire & gas and telecom physical topology but excludes control system logic. The scope of this module extends from the physical field instrument and associated cables, termination data (junction boxes, cross-wiring cabinets, etc.) to the I/O card and channel/ports into the control system.

This module is both comprehensive and very complex with over 10,000 loop drawings for Åsgard B alone. The accuracy of data and reliability of data presentation in this module is of utmost importance as errors can give rise to highly costly uncontrolled plant shutdowns. Major savings will be realised by the elimination of costly instrument loop drawings and producing parametrically generated loop reports “on demand”.

This module will be based on integrating Intergraph’s INtools product with Notia. This means that loop topology data will initially be held external to Notia though data and graphical loop reports will be available via the Notia web-browser.

## **PIM Electrical Distribution Network Administration**

This module includes the detailed topology of the facility electrical distribution network allowing navigation from the main generators via switch gear and distribution boards and junction boxes down to the ultimate power consumers such as motors, heaters, instruments, etc. Functionality will initially cover tracing of the electrical distribution up and down the network but will be extended to include additional functionality such as:

- Ignition source analysis and isolation studies
- Location of available capacity for the installation of new consumers.

This module will be based on the integration of Notia with Intergraph’s Smart Plant Electrical product.

## **PIM Quality Control**

A separate Quality Control module has been implemented externally to the PIM Data warehouse as a staged data store where information is assembled and subject to quality control before loading into the PIM data warehouse. This is an existing application that has been developed over several years and has been adopted as a front-end to the data warehouse in Åsgard.

The structure is based on a denormalised relational table structure that is simpler to run QC checks on before data is “exploded” into the POSC/Caesar structure.

QC checks performed are extensive and include:

- Syntax control (tags, document numbers, etc.) and valid codes (areas, systems, document types, etc.)
- Referential integrity, for example are the to/from tags in the cable index valid, document references to tags that are valid, etc.
- Degree of completion - identify apparently missing data.
- Integrity between indexes, P&ID’s and 3D models, e.g. is the line list consistent with the P&ID and isometric data in the 3D model.
- Engineering technical logic checks, e.g. are max. operating pressures quoted in data sheet information below max. design pressures, loops are electrically complete, electrical network topology complete, etc.

Quality is therefore verified before import to the PIM/DWH. Reports from QC are made available to contractors via the PIM/DWH to enable them to rectify errors and omissions before resubmission.

## PIM System Administrator Tools

These are not an end-user application, but a system administrator's tool-box for configuring Notia for a customer implementation. Though very powerful, this module uses a "drag and drop" type environment and requires no IT programming capability by the user. The module is used to define:

- plant items (Business Objects) to be handled in Notia including their relationships to each other and behaviour (methods).
- menus, toolbars and look-up tables
- user dialogues
- user groups and users

A separate module is available to define the syntax rules for naming any plant item defined in Notia eg. tag numbers, document numbers etc. The module is highly flexible to generically handle any customer engineering numbering system and includes facilities for generating blocks of plant items.

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## 8. Summary and Future Directions

PIM data warehouse is providing the channel for the seamless hand-over of as-built plant data from the project. Normally this is an operation that can take a year and cost up to US\$10m. With PIM the data is properly validated in the staged data store before import from contractors and suppliers. Quality problems are identified early in the project and fixed when it is easy and relatively inexpensive to do so. Information is retained as structured data, which automatically becomes available for plant commissioning, and from the first day of operations and maintenance. Where PIM applications are used for data maintenance then data is validated as it is created.

Statoil has already noted that easy access to all relevant information helps to empower offshore workers and is reducing its large on-shore resources too. There is potential for cutting a huge number of plant drawings and other documents, which typically duplicate much of the plant information and make it difficult to control.

The benefits from PIM are many, varied and large: Asgard/Statoil summarise the potential savings as :

- reduce plant-commissioning work by 10-20%
- reduce OPEX by 10-20%
- If PIM could be employed from the start of a new plant, potential to save up to 30-40% of the total development cost. The potential savings in a project like Asgard would be between US\$1.3 -1.7 Billion.
- Reduce 10-20% of plant operating costs
- Reduce the volume and cost of equipment documentation for operations by 80%
- Reduce the cost of drawing revision from US\$500-1000 per drawing to US\$50-100 with change management
- Reduce requirement for data handover – historically could take up to a year and US\$10M to quality check and load missing data for a single platform

The requirement, however, is for a data-centric approach where most documents are replaced by reports from current data generated on-demand. It also needs an effective data warehouse, and a range of practical e-Engineering applications. Intergraph's commitment to extend its engineering framework core represented

by Notia to cover all PIM modules and provide a common web-portal for the maintenance of this data are important milestones for the future.

The challenge now lies in integrating Åsgard's E-engineering solutions with the drive in Statoil to attack costs through implementing improved business processes across the value chain via totally integrated B2B E-business solutions including both Engineering Process Re-engineering and E-commerce components

***Phil Gould, Intergraph Process and Building Solution Division's Director of Information Management Solutions said***

*"Intergraph and Statoil, through Åsgard, have developed a close working partnership that will now drive forward the development of Notia to provide the ideal solution for the Åsgard installations. This reinforces our strategy to work closely with clients to ensure our solutions meet their business requirements."*

***Odd Mosbergvik, Åsgard director agrees***

*"The close collaboration between Statoil and Intergraph has been paramount to our success. The synergy we have managed to achieve through our partnership has given us the confidence to proceed to meet the challenges ahead in reaching the goal of fully integrating work-processes across the value chain by introducing e-Engineering."*