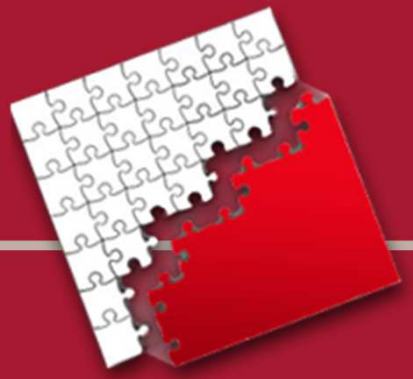
Rapid Asset Data Capture
- A case study -

Rapid Capture, organisation, management and reuse of unstructured information on brownfield Sites



Bill van Butzelaar and Greg Rohde

woodside

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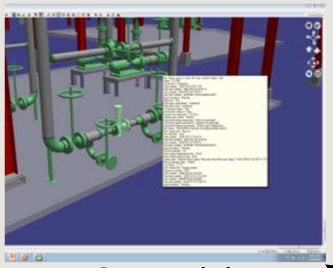
This presentation contains forward looking statements that are subject to risk factors associated with oil and gas businesses. It is believed that the expectations reflected in these statements are reasonable but they may be affected by a variety of variables and changes in underlying assumptions which could cause actual results or trends to differ materially, including but not limited to: price fluctuations, actual demand, currency fluctuations, drilling and production results, reserve estimates, loss of market, industry competition, environmental risks, physical risks, legislative, fiscal and regulatory developments, economic and financial market conditions in various countries and regions, political risks, project delay or advancement, approvals and cost estimates.

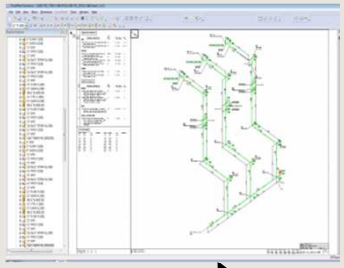
All references to dollars, cents or $ in this presentation are to Australian currency, unless otherwise stated.

References to “Woodside” may be references to Woodside Petroleum Ltd. or its applicable subsidiaries.

The Deliverables

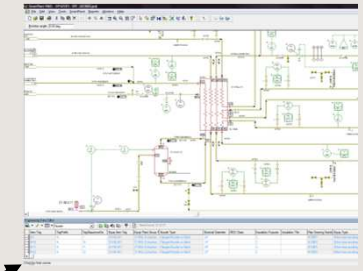


3D Model

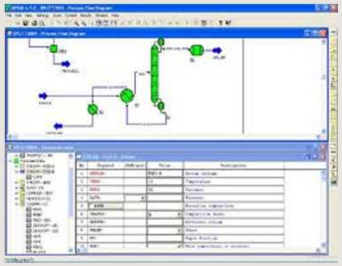


Piping

Data sheets / lists

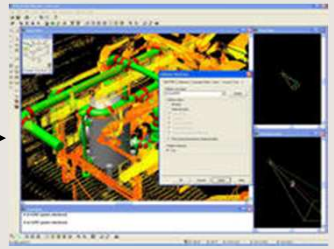


Mechanical Technology

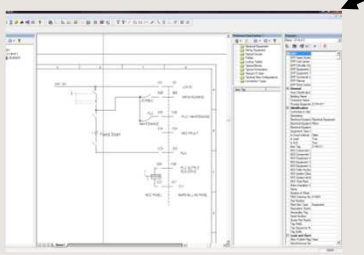


Process Engineering

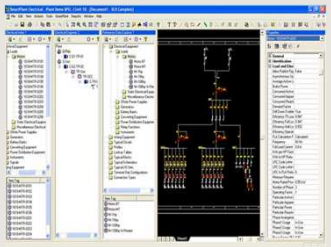
Master data



Laser Scanning

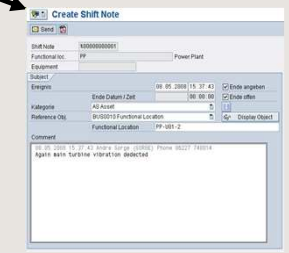


Electrical Engineering



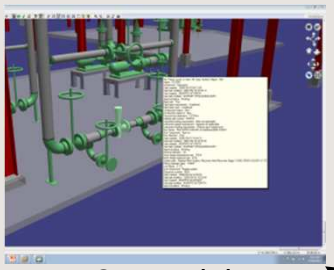
Cabling

Maintenance



Electronic shift log

Consistency, Re-use & Correlation of Plant Items



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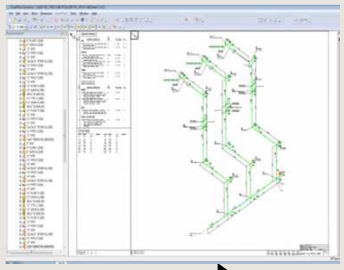
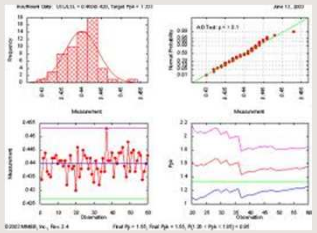
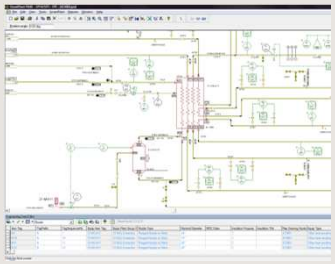


Isometrics

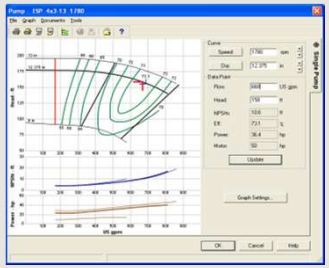
Data sheets / lists



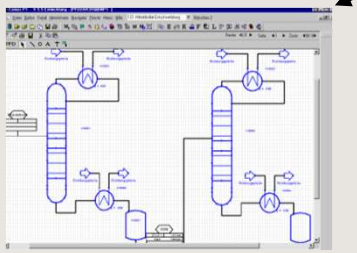
Process control



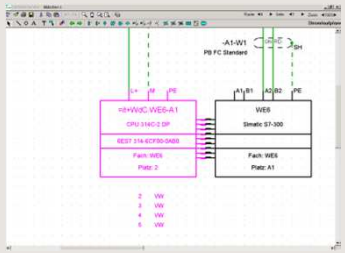
P&ID



Control valves

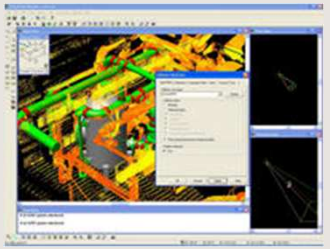


Process Flow Diagrams



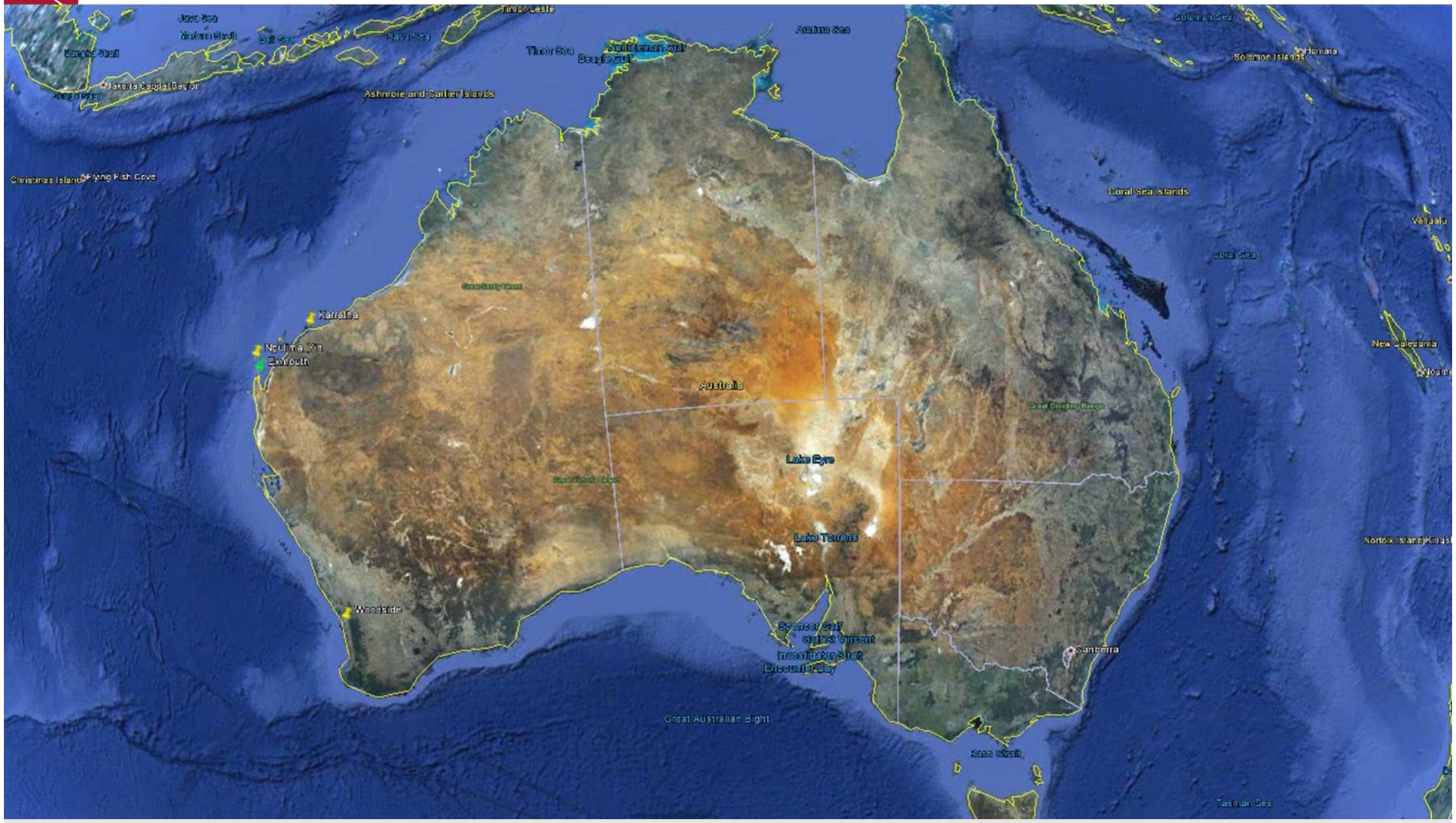
Loop

Maintenance schedule



Laser Scanning

The Brownfield site

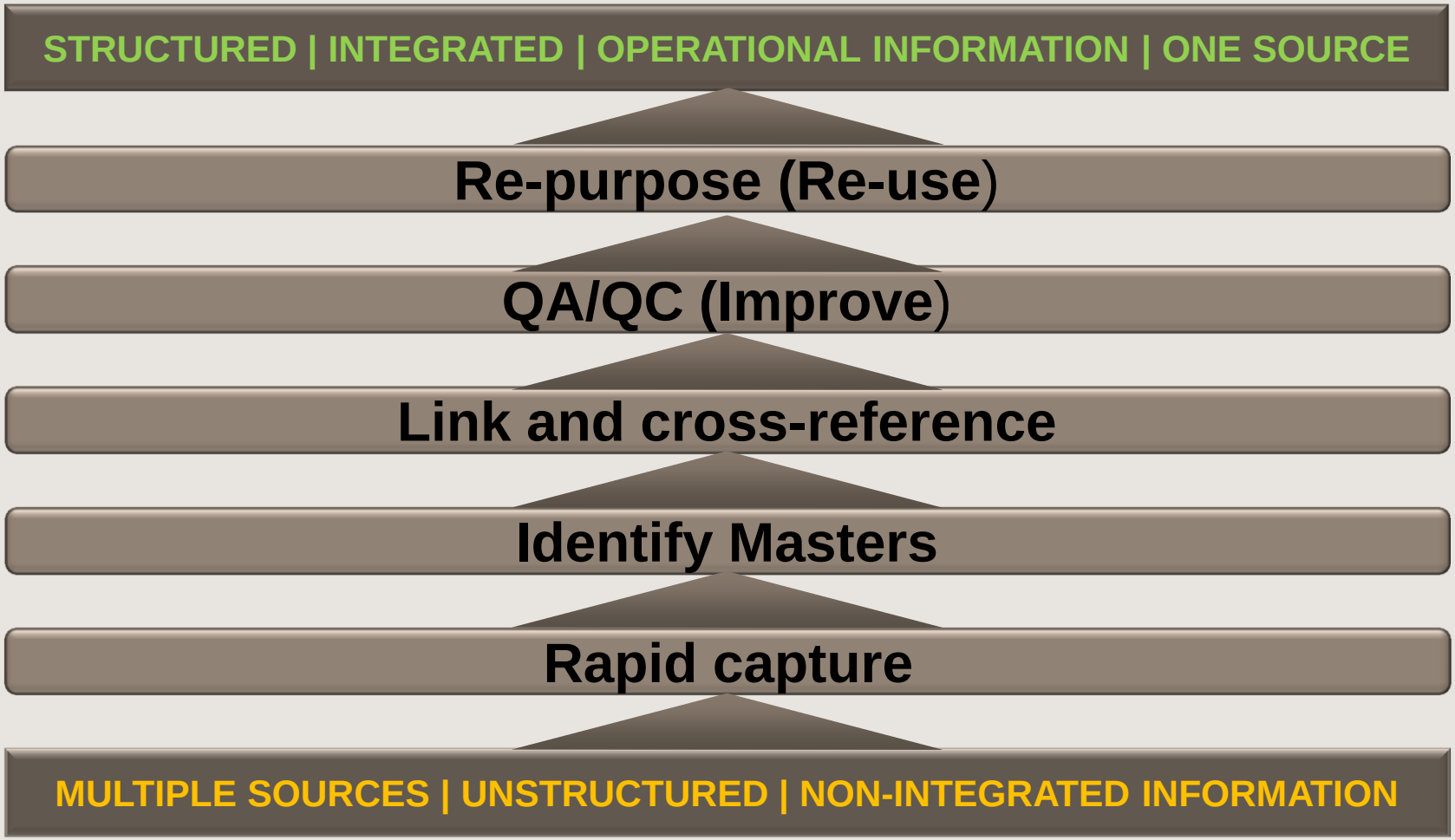


The Scenario

- Operational plant purchased “as is, where is”.
- Significant engineering scope being prepared for execution.
- Multiple versions of drawings and documents from multiple sources, or even from the same source.
- Data and documents managed differently at several international locations.
- Multiple document and data formats used.
- Unknown volume of documents and data missing.
- Unknown “as built” status of documents.

DATA SOURCES	11 (and still receiving)
DRAWINGS / DOCUMENTS	328,000 +
DATA FIELDS	85,375,056 +

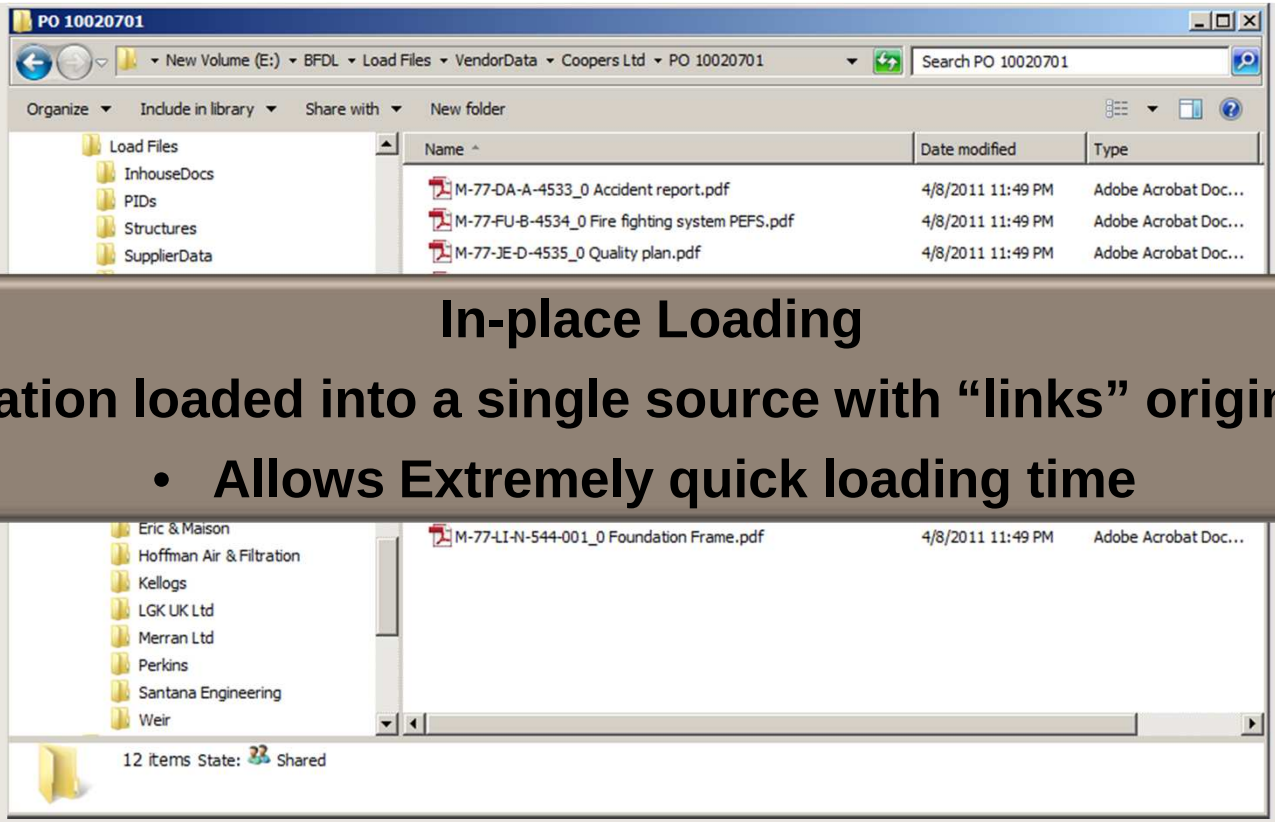
To bridge this gap we need…..



The process

- 360,000 documents Loaded @ 1000 docs/hour (7 critical doc types loaded first)
- Extracted and associated metadata (Doc Type, Discipline other related items) from file names and BDO database.
- Documents loaded “in-place” – SPF points to the files in original stored location.
- Analyse to find the set of master versions
- Development of a Portal to allow navigation and viewing of documents
- Developed Workflow so Woodside Technical authority could view candidates and decide on the master
- Process the Master set and extract Tags
- Automatically make associations – Tag-Document relationships with aliasing.
- Deliver controlled documents into portals to a business criticality schedule using simplified business processes
- As building

Unstructured data loading …

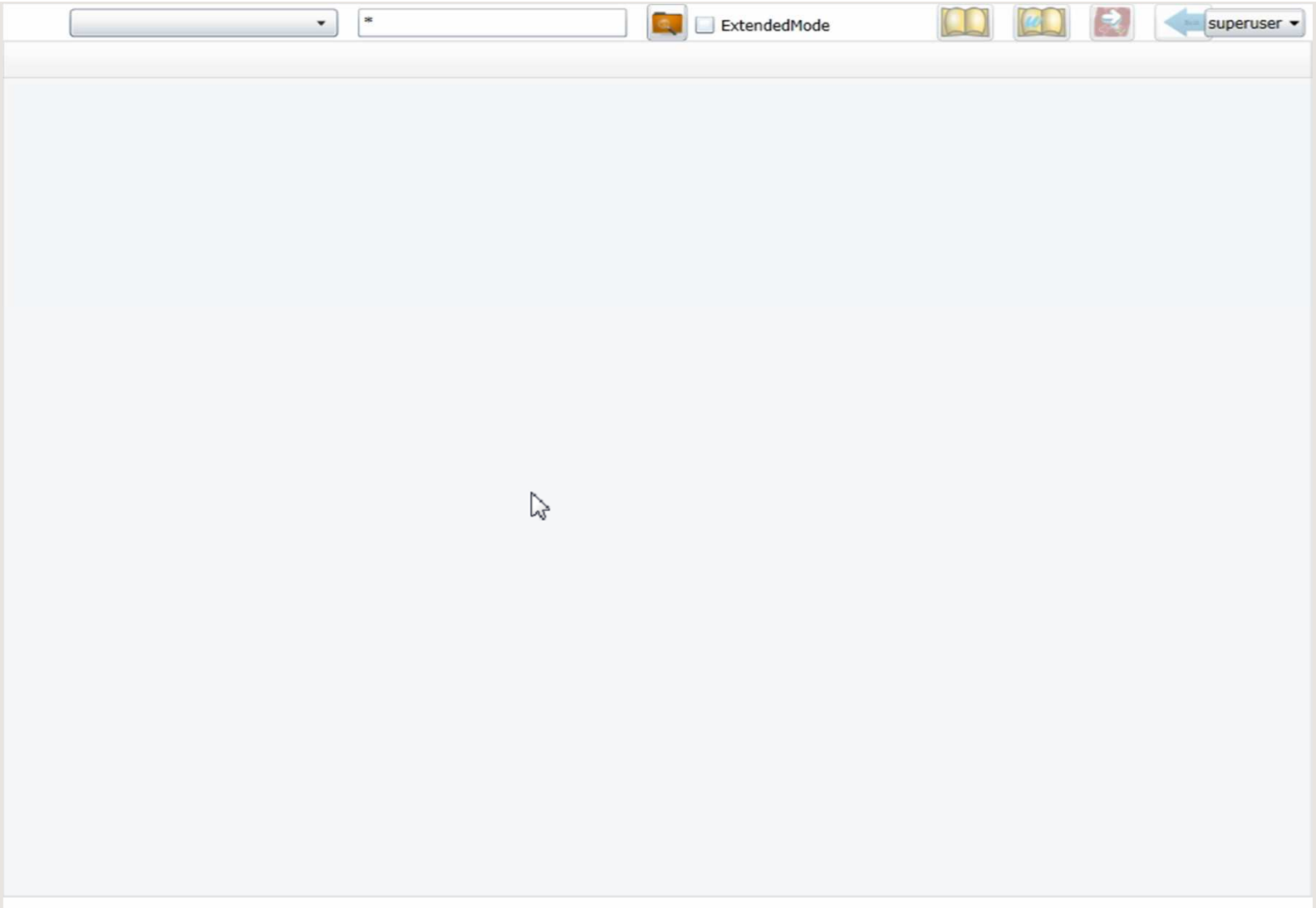


In-place Loading

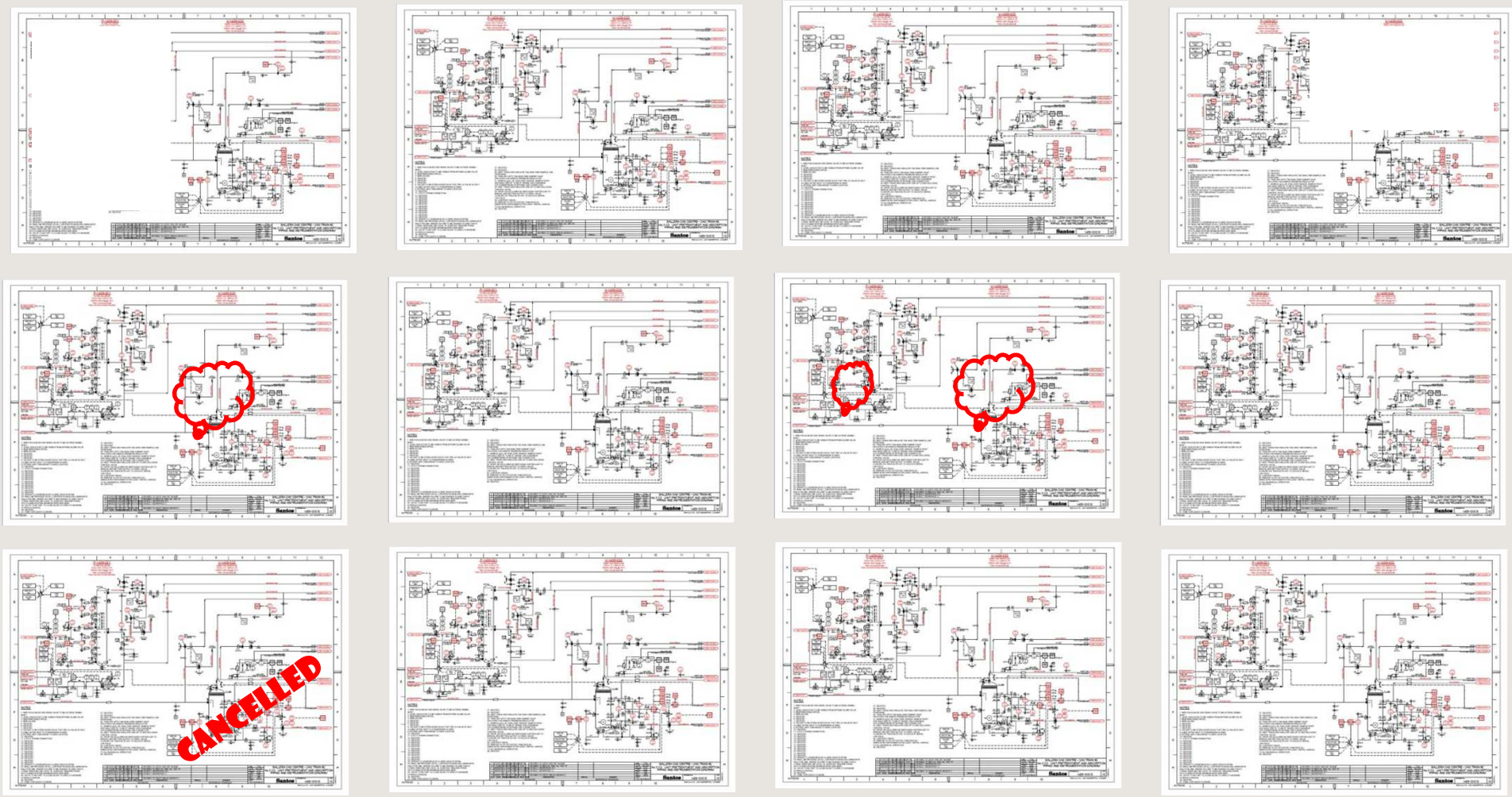
- **Information loaded into a single source with "links" original to files**
  - **Allows Extremely quick loading time**

UNSTRUCTURED information in a variety of formats and from multiple sources

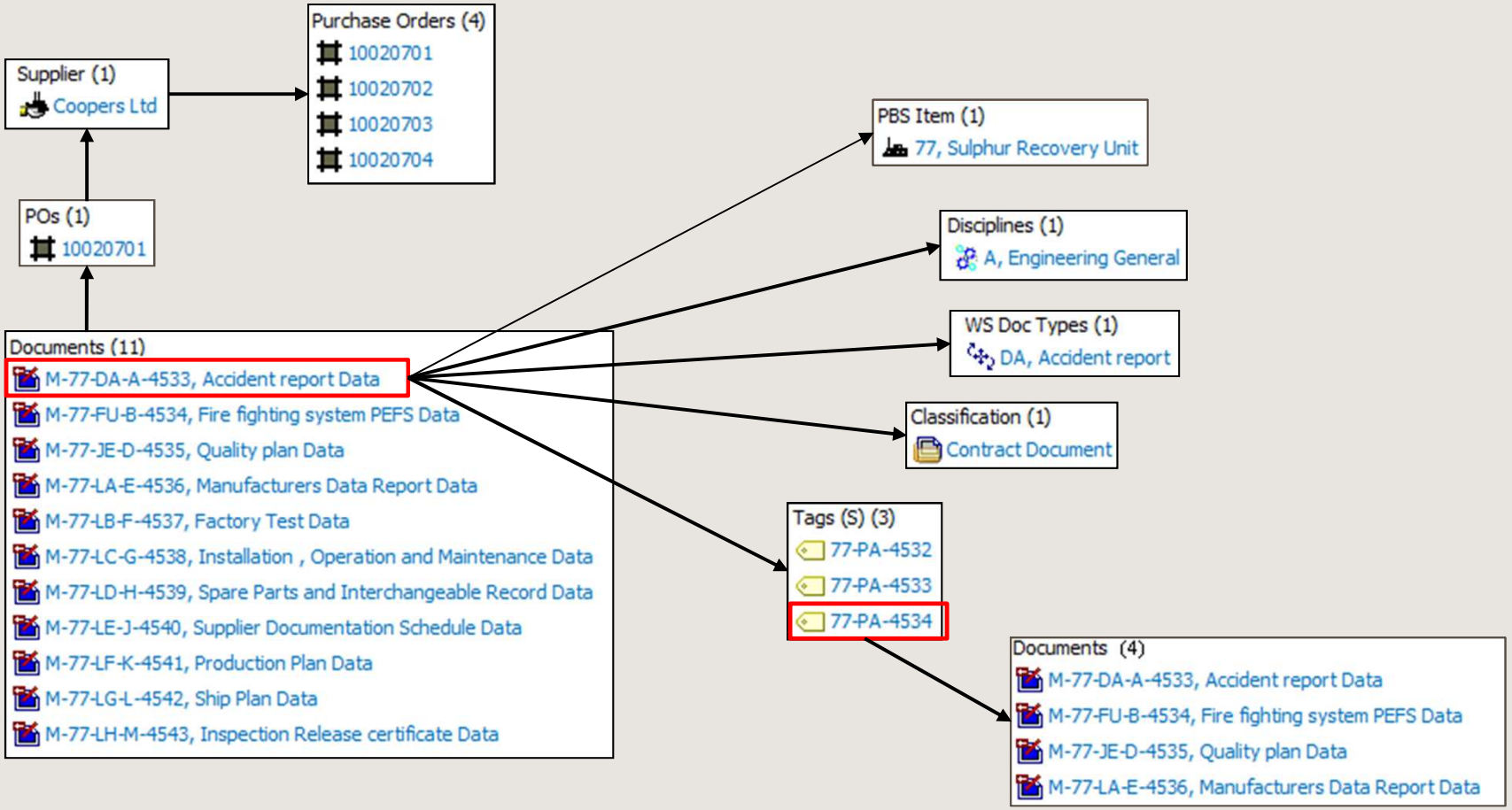
Capture – Post Processing



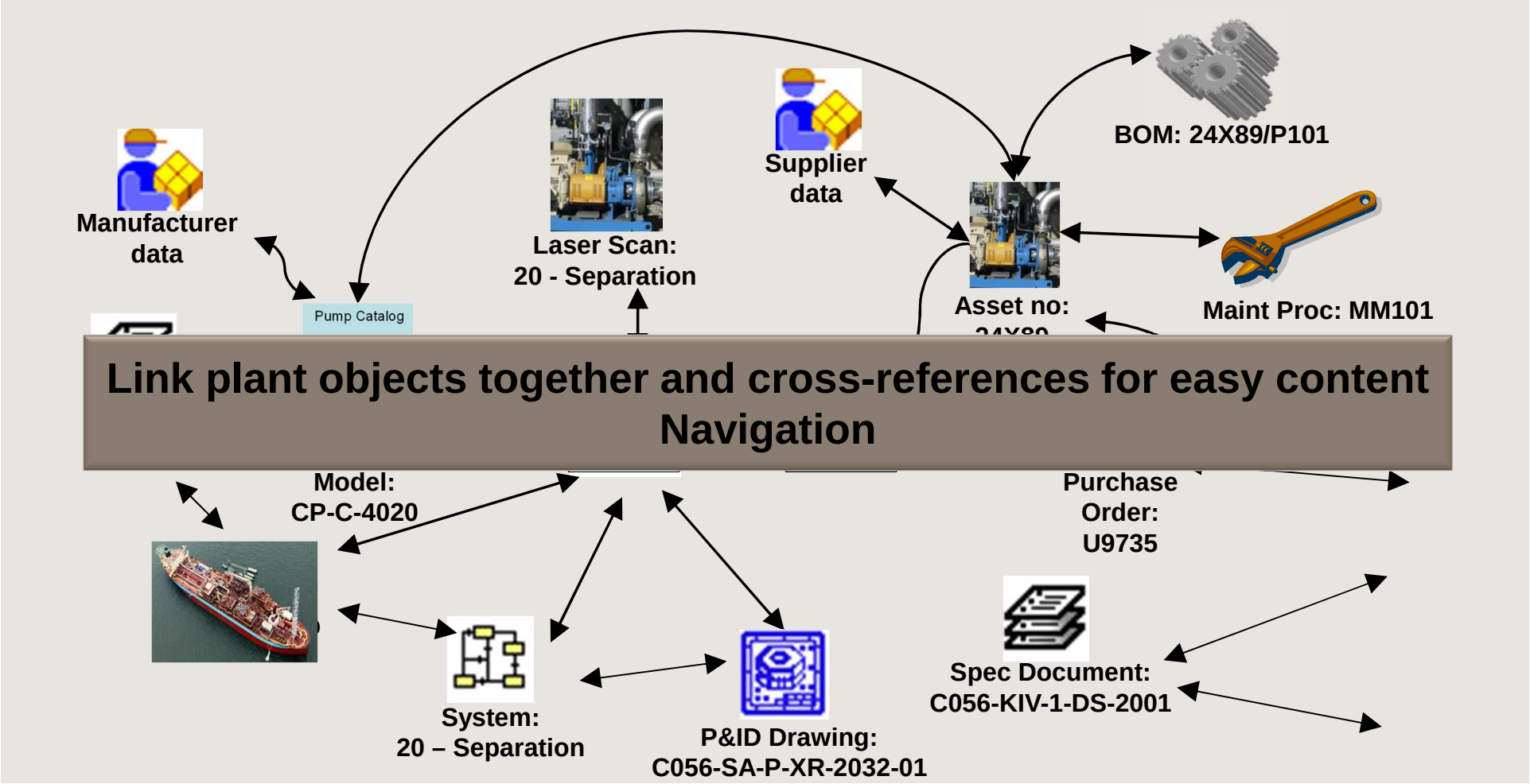
Identify the Master



Unstructured data analysis



Data structure analysis complete ..



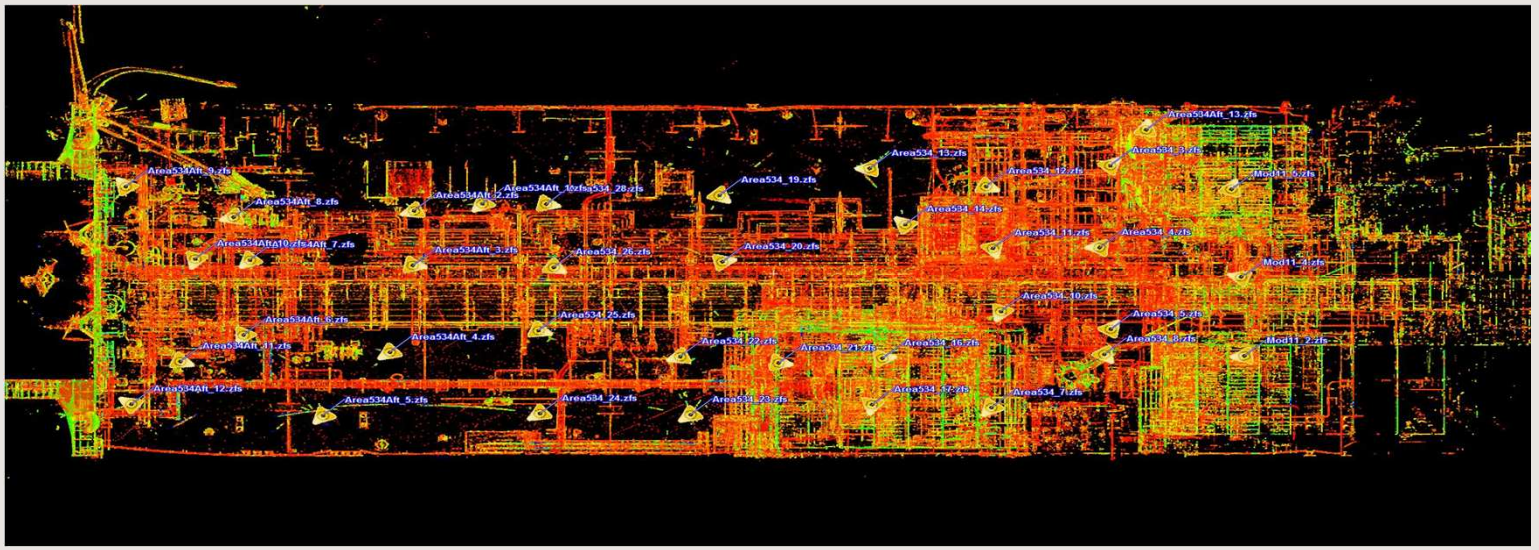
BDO (Fusion) Realised benefits

- Significantly improves analysis time i.e. Enables the ability to search on a document and view every version before making an assessment. Much faster than using Windows Explorer.
- Allows multiple users to be working within the one Master Data Source.
- Singular software source i.e. No need to run multiple applications such as MS Excel, MS Access.
- Highly configurable and customisable, which is only beneficial if the client firstly understands what they require and secondly understands the capability of the software.
- Contains an integral web based Portal allowing project personnel remote access to live data during the project phase, a key requirement on all major projects.
- Workflow Process to enable documentation approval and acceptance.
- Operates on common industry standard software such as SQL Server as well as Oracle.

As Building - Field based data capture

1. Physically collect all and accurate As Built data for existing Brownfield Plant.
2. Data cleanse existing drawings and databases.
3. Populate Portals with As-Built Data from any source or cad system
4. Keep Asset Data Up-Dated as an Out Sourcing Service for Customer
5. Surveying using photo and laser scanning

Leica 3D Laser Surveying

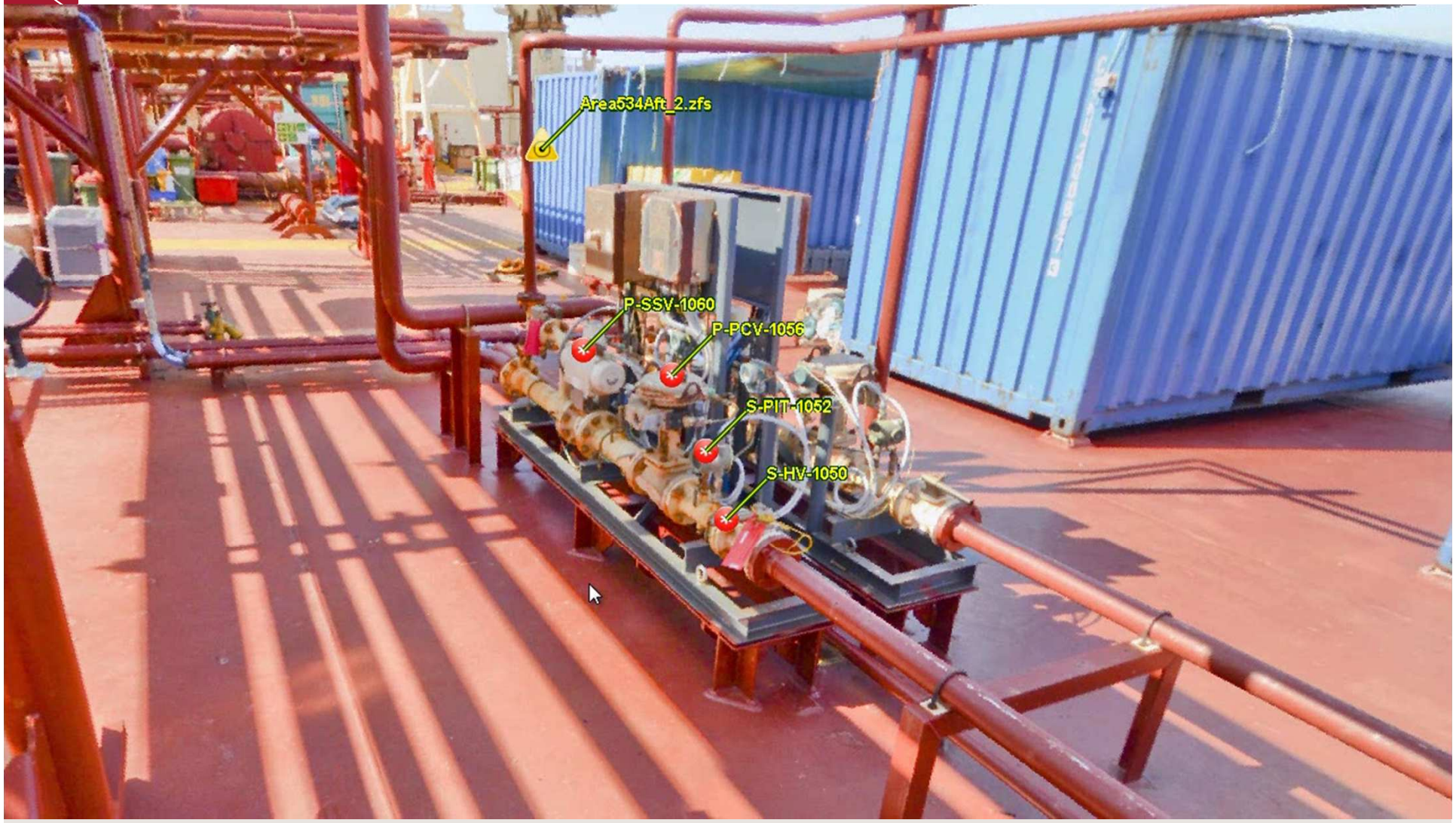


Scanner positions were chosen to satisfy:

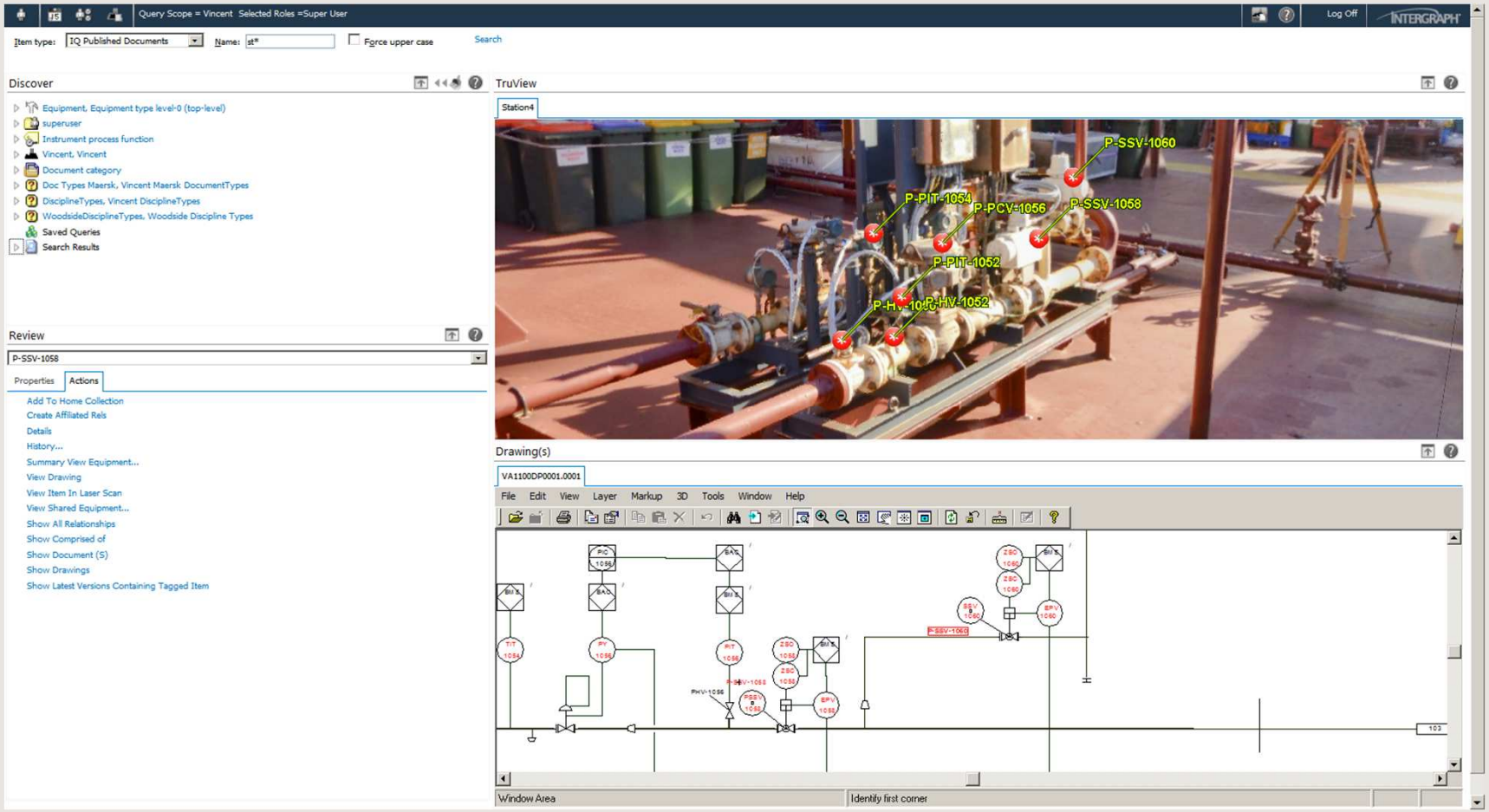
- Scope – Vessel Topsides, engine room, turret, and pump rooms.
- Maximise target usage to optimise surveying density.
- Point cloud overlap to optimise clarity.
- Redundancy to allow for re-surveying of modified areas.

The point cloud

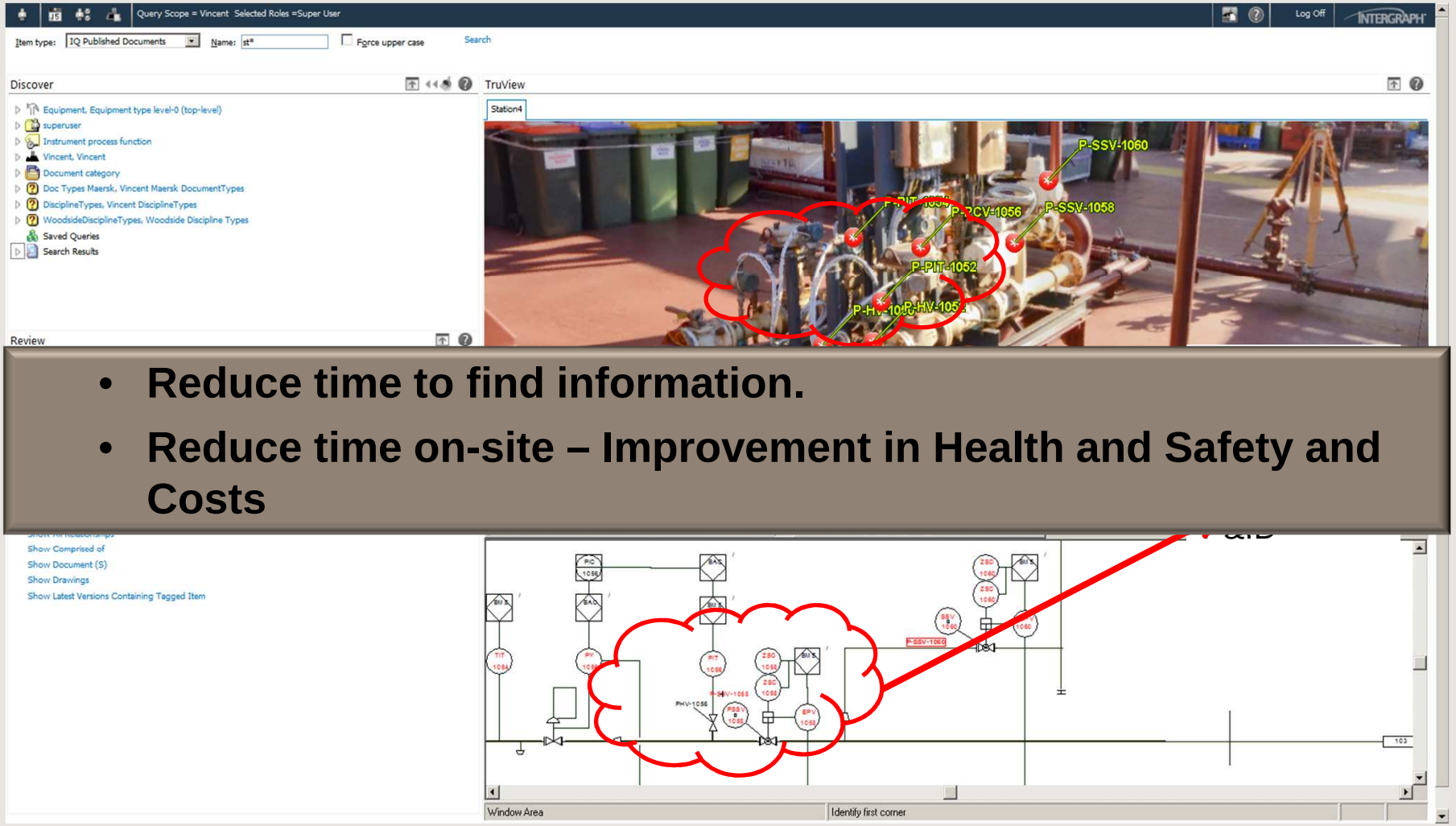
Laser Scanning with High-Resolution Photos



Bringing it together in SmartPlant Fusion

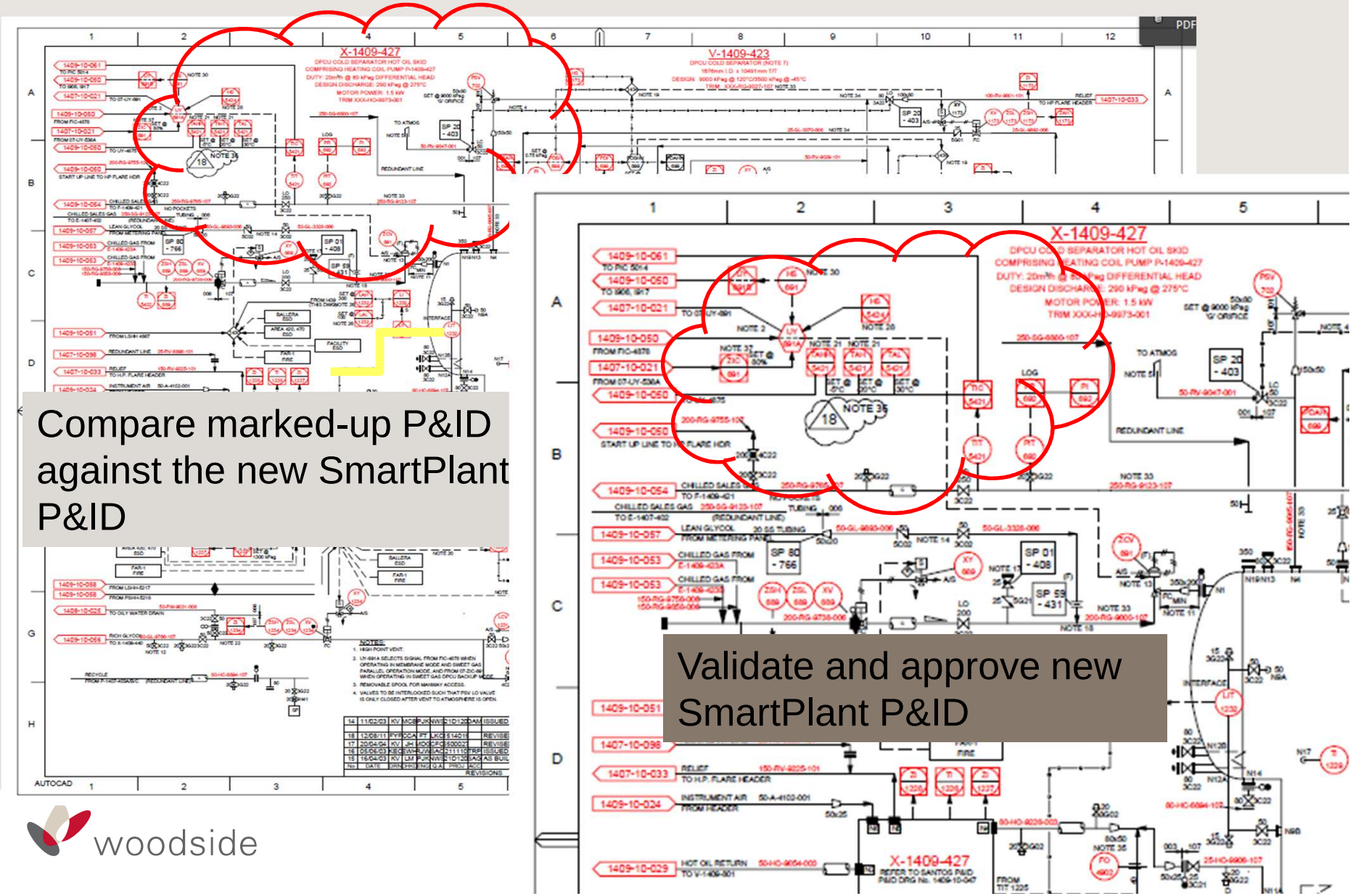


As-Built Versus As-Exists



- **Reduce time to find information.**
- **Reduce time on-site – Improvement in Health and Safety and Costs**

Convert “as built” into an Intelligent P&ID System



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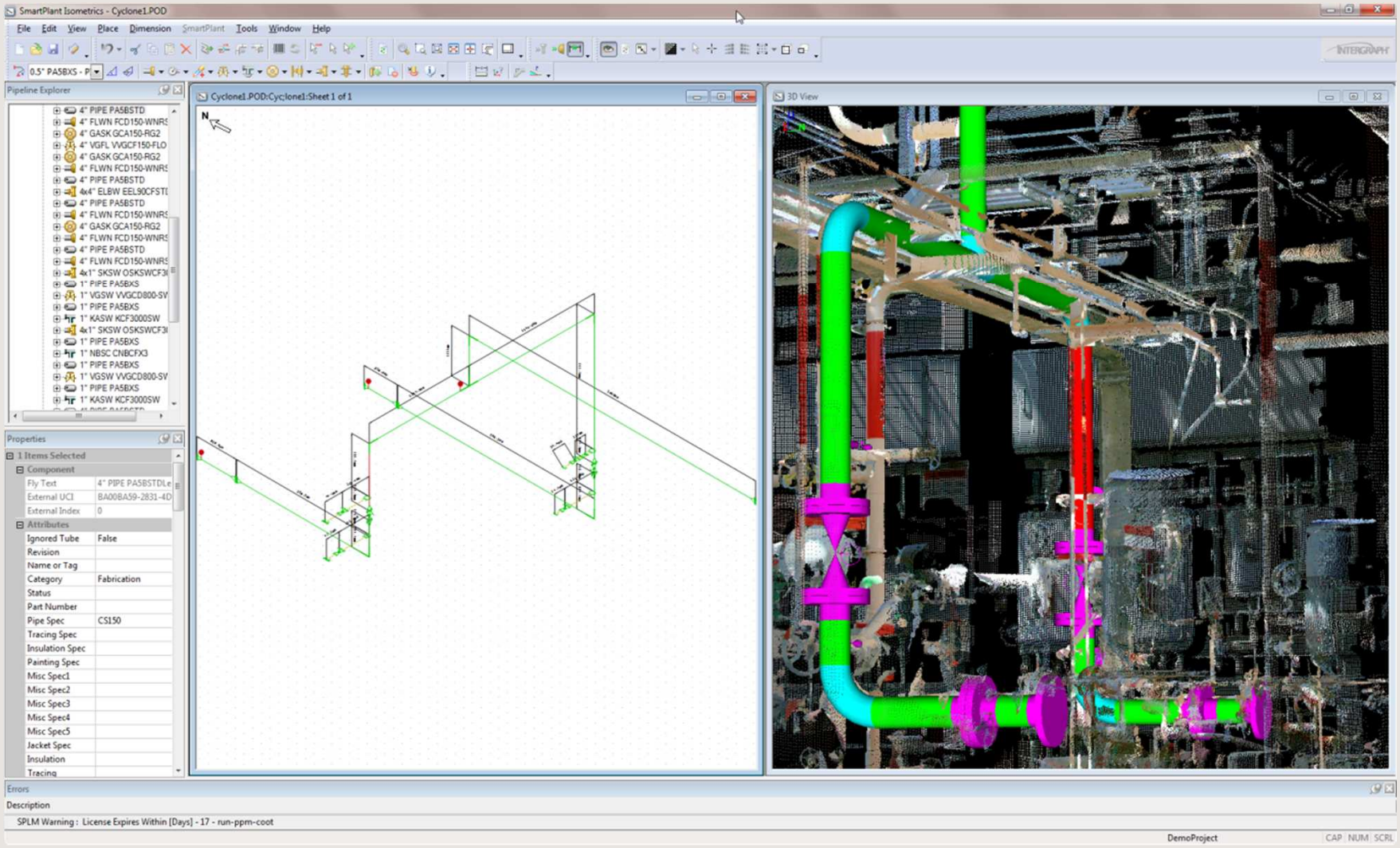
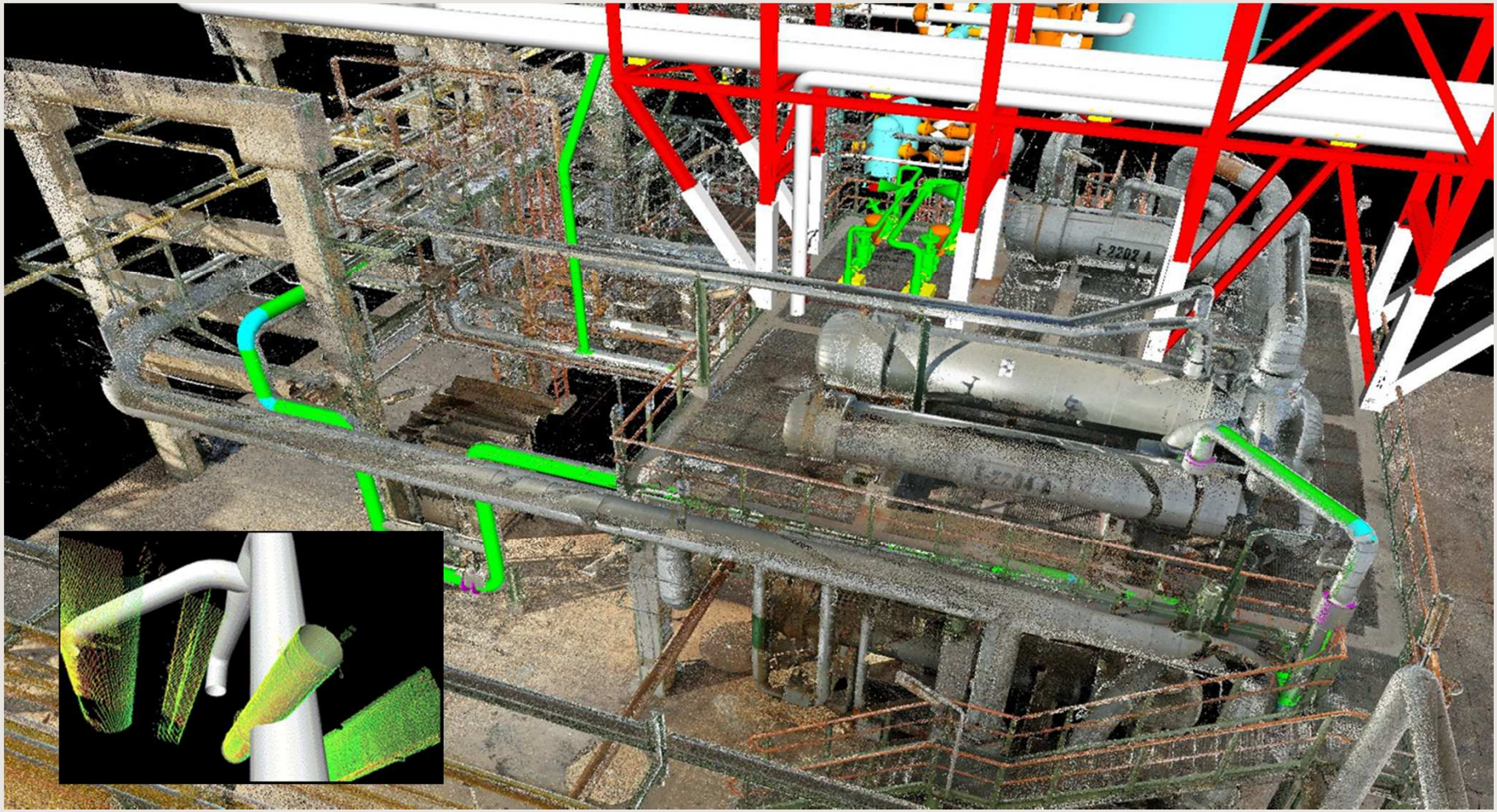
Create Isometrics using CloudWorx for SmartPlant Isometrics



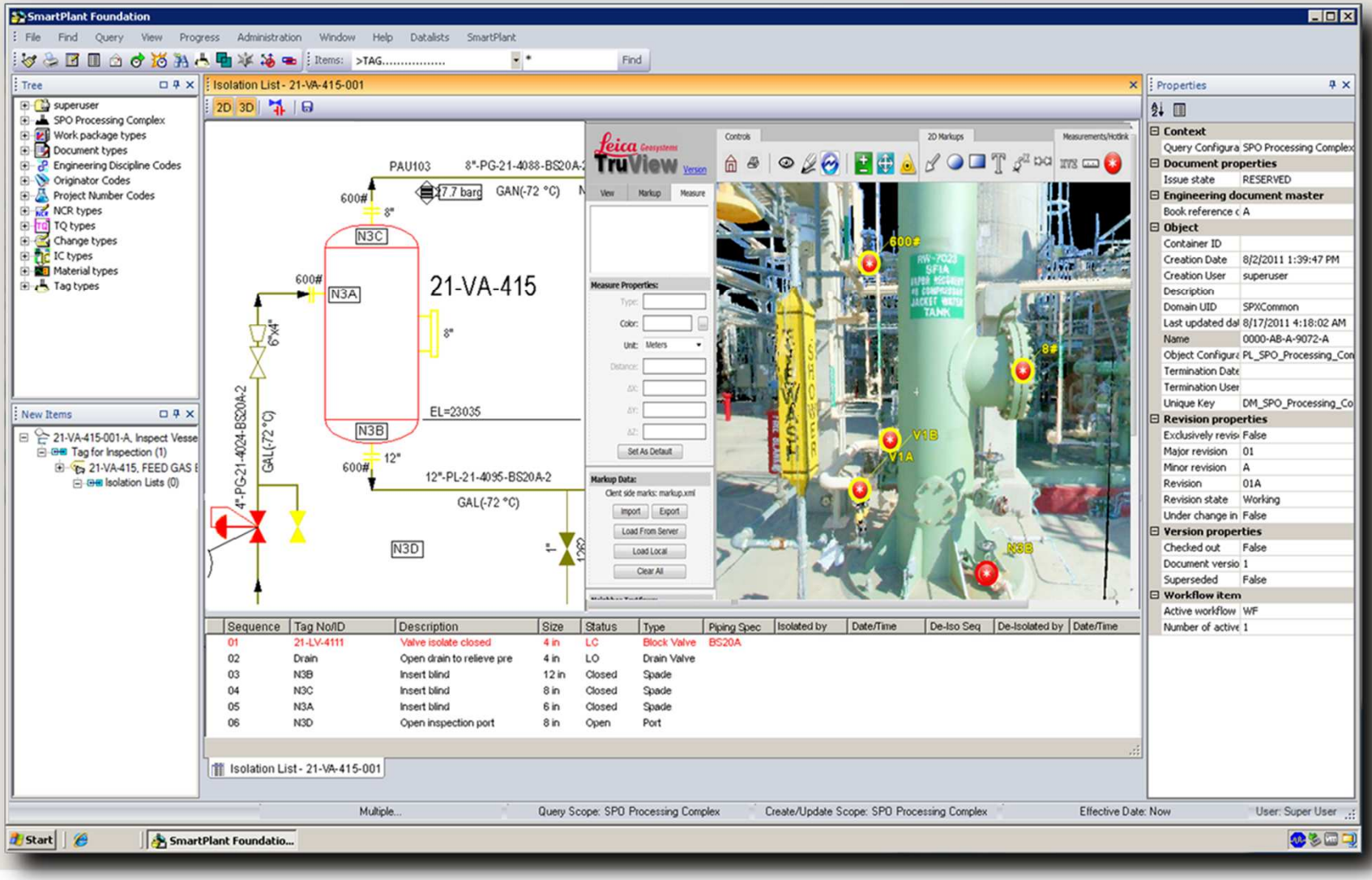
Point Cloud and S3D Model - Hybrid



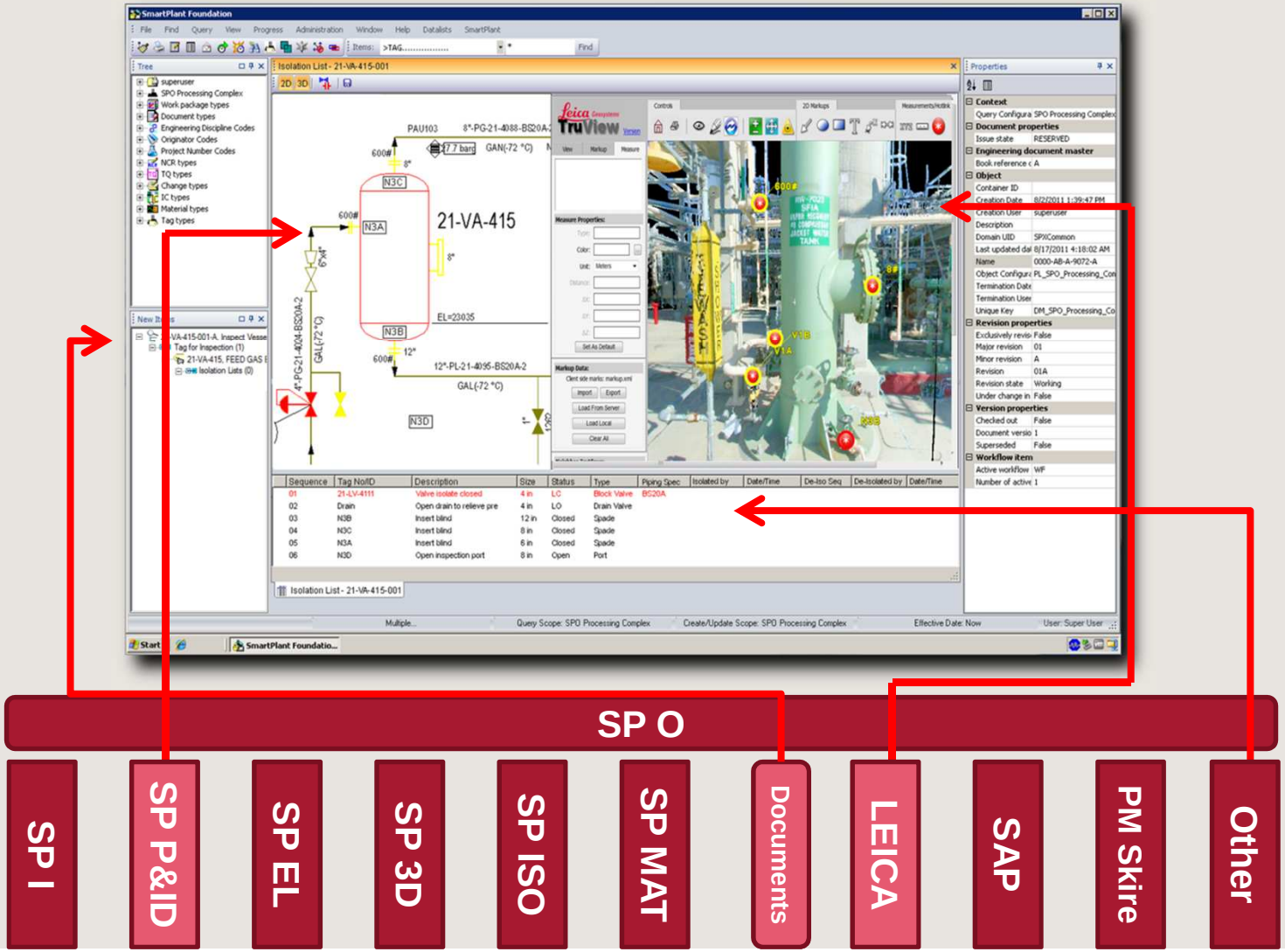
Mobile online asset tagging and as building

1. Create a register of assets and assign tags (RFID, barcode, physical, GIS) online
2. Manage asset location, status and condition online using customizable forms
3. Capture as build results in the field on handhelds.
4. Manage inspection schedules, including overdue alerts
5. Gain easy access to all documents relating to assets
6. Get flexible reporting

Lock Out Tag Out



Data Integration Opportunity



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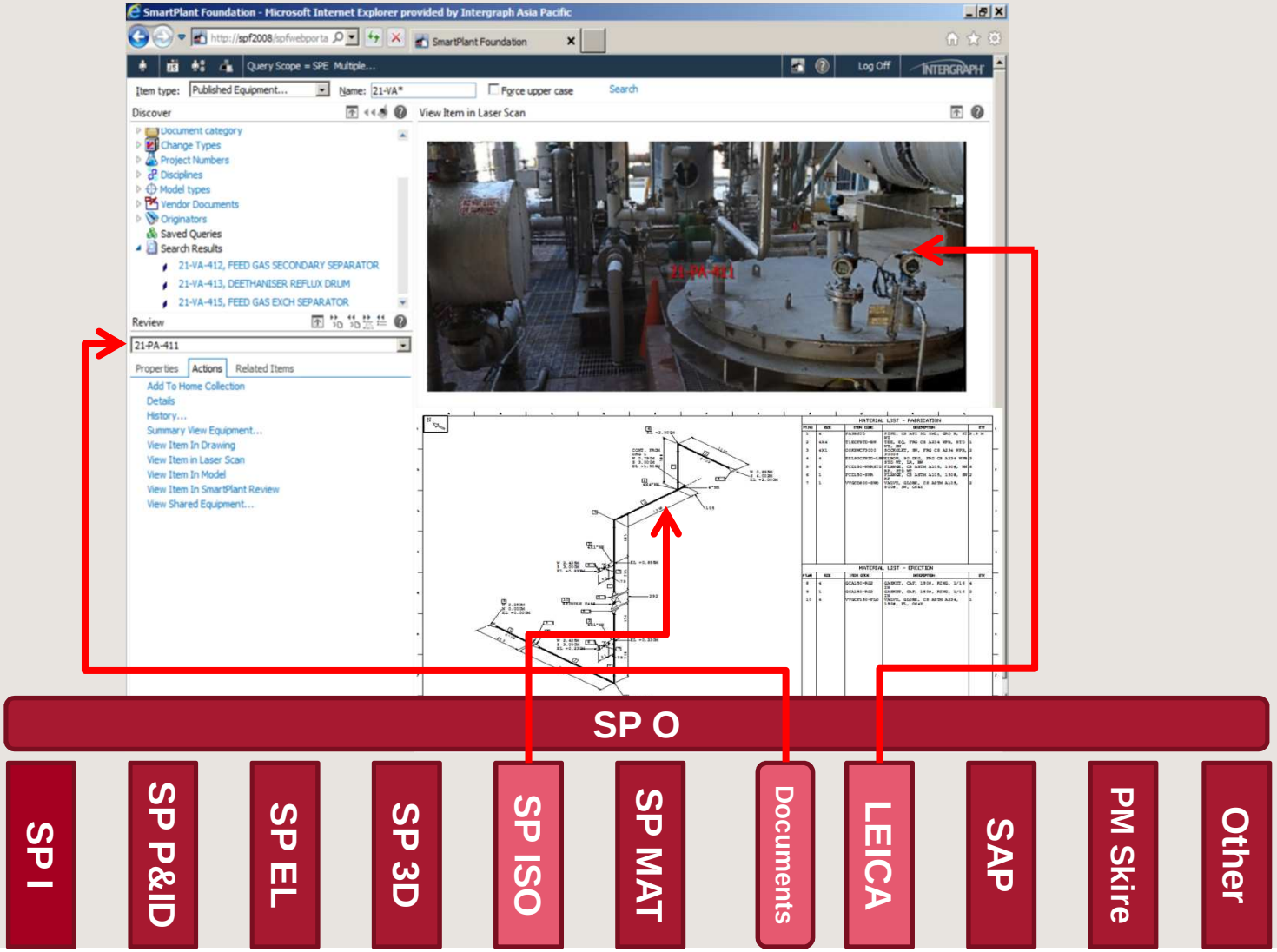
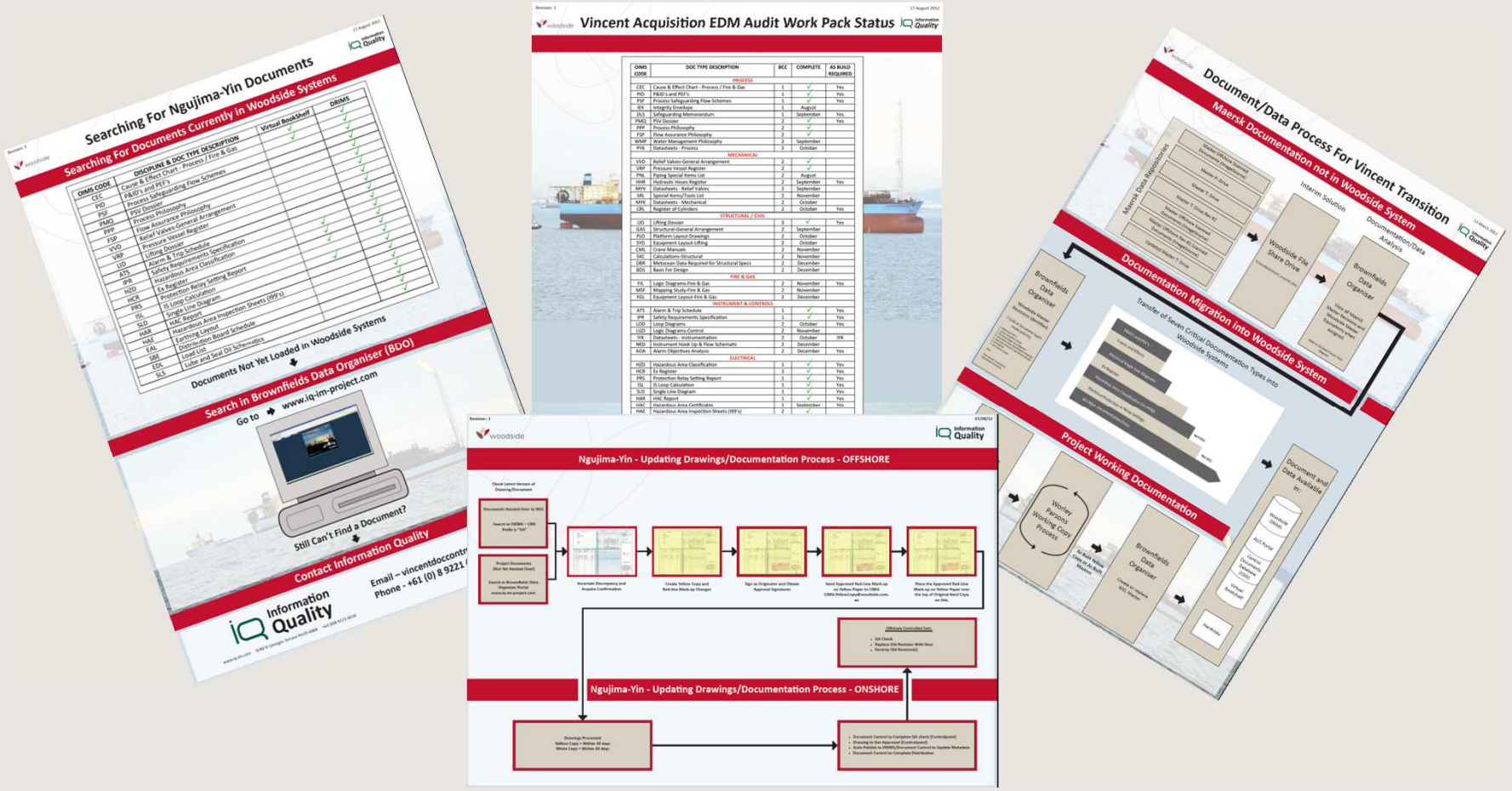
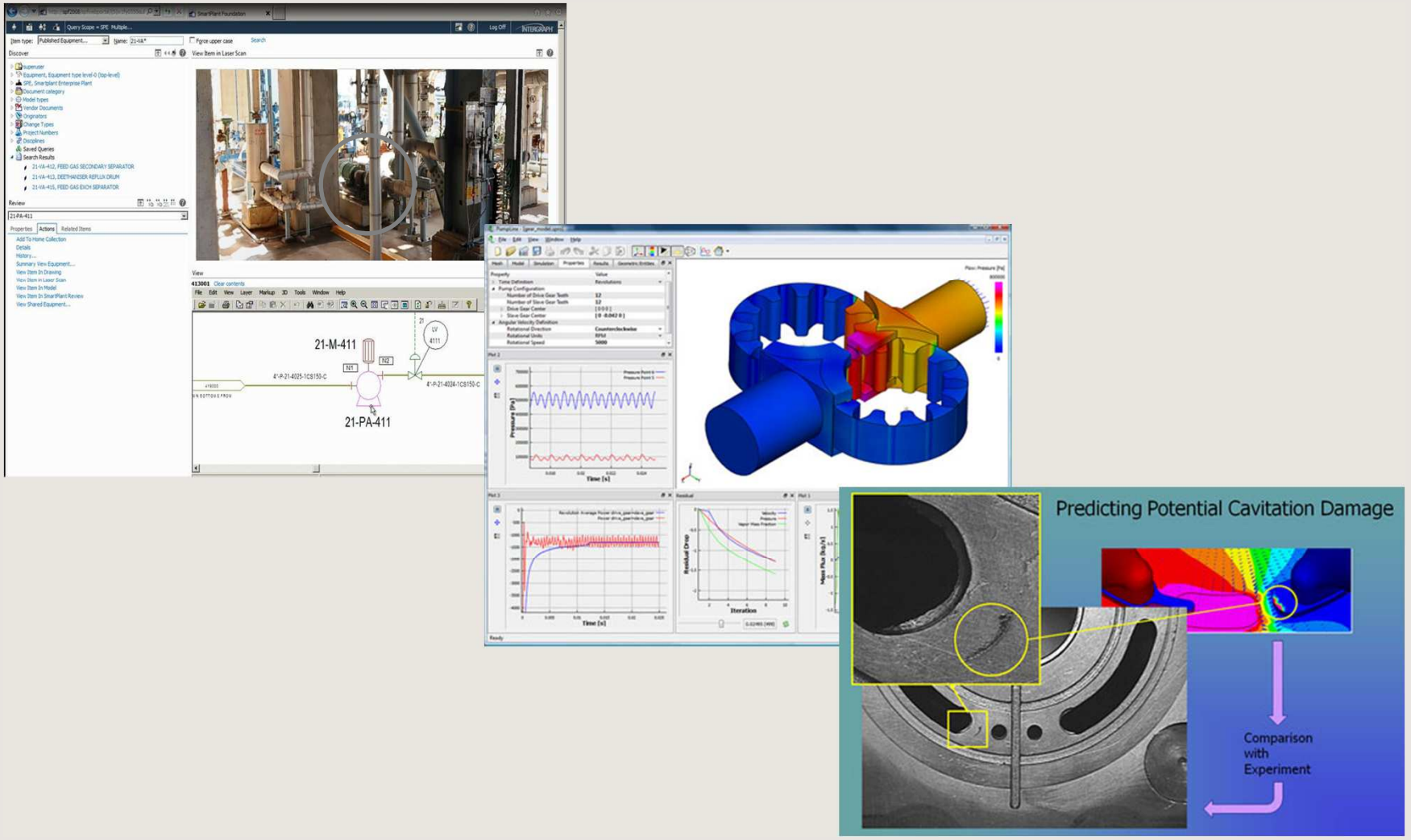


Change management and communications

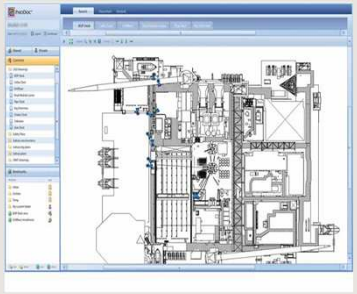
The more a user has to remember, the less likely he is to use the processes or to interact with the systems.



Visualisation and Predictive analytics

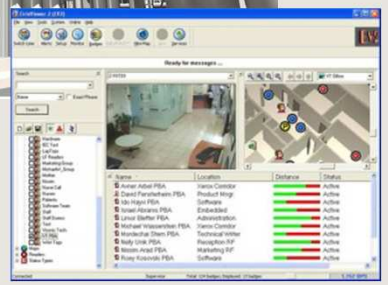


Integrated Operations ....



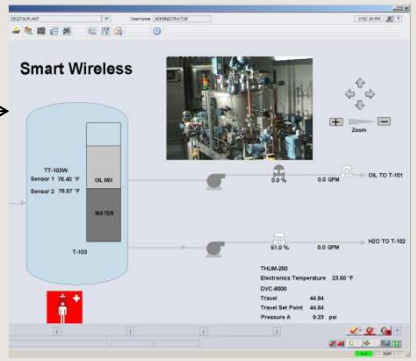
Engineering Tools

3D Model

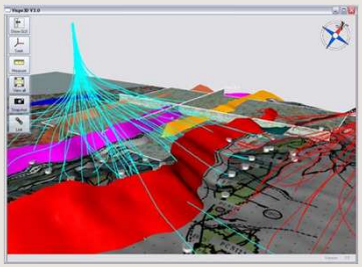


People location and camera

Predictive analytics



CCTV

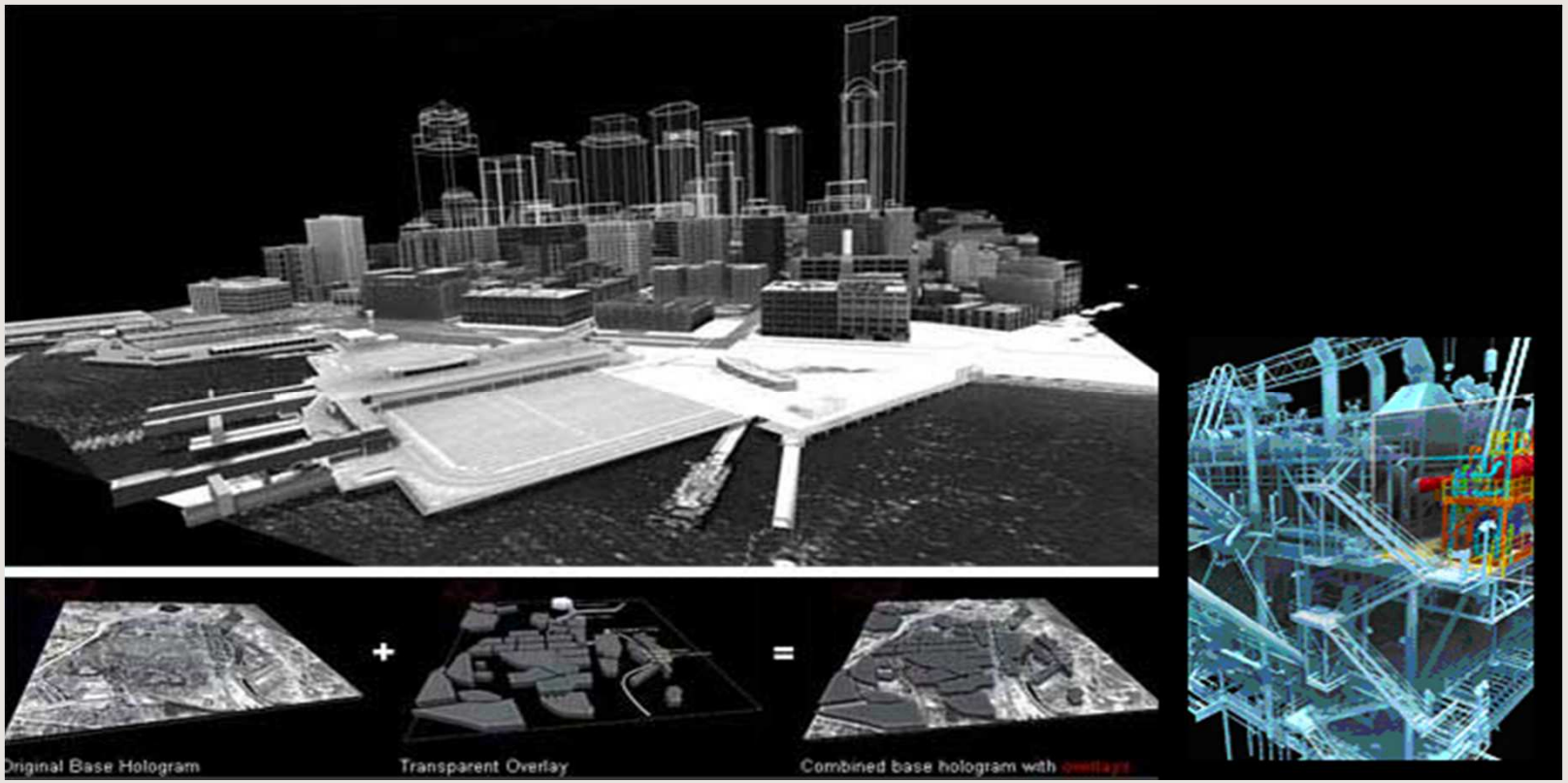


Virtualisation / modelling

Video Conferencing

Wireless mobile worker

3D Collaborative Displays (Hologram)



Holographic projection that is not only a basic three-dimensional model, but a visual index to the data or information associated with that model's geography, generated from point clouds, terrain models, and 3D construction models.

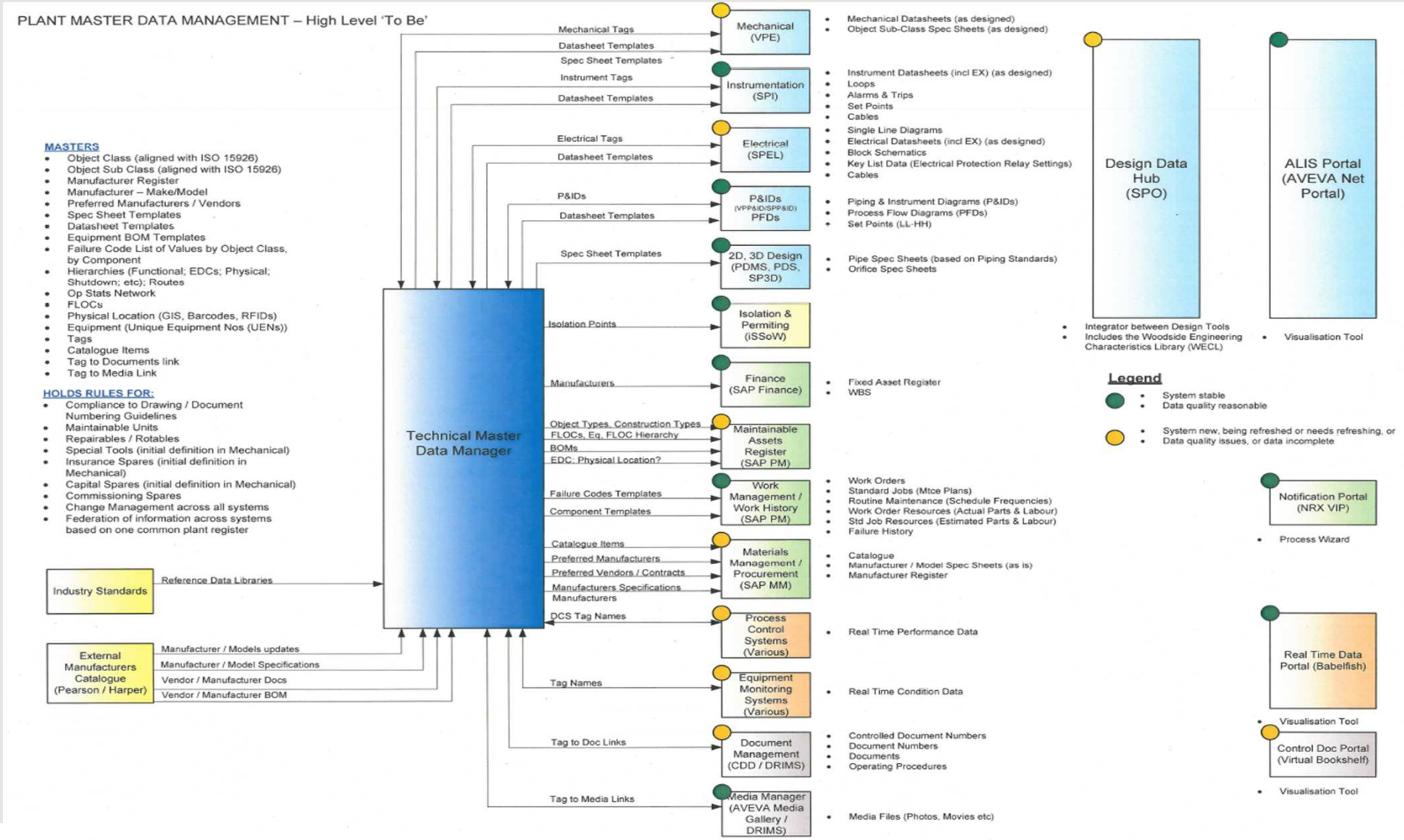
Integration of Real Time Data

DCS installations on every facility, and nearly every unit, hundreds of thousands of process data tags and millions of data points.

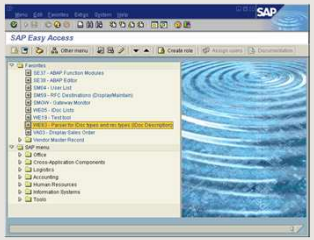
Challenges we are facing:

- Volume is growing rapidly, engineers are drowning in data
- Our focus has to be on exceptions
- Smart surveillance and analytics need to be part of the new engineers toolkit
- Using history to predict the future, model driven analytics
- Upstream systems are demanding consistent and verified values
- Change management is paramount

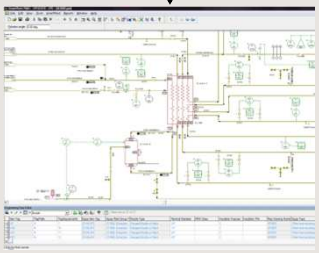
Technical Data Relational View (collect once use many)



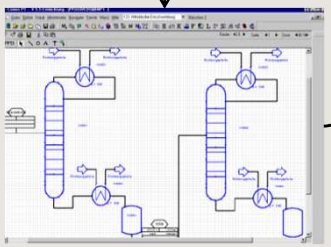
An Integrated Example — Real time early warning....



Critical Equipment

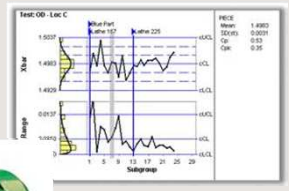


P&ID



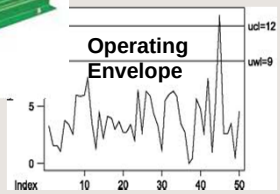
Process Flow Diagram

Statistical deviation detected



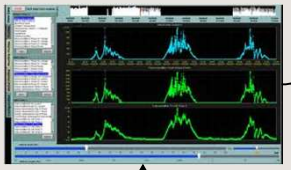
Vibration, flow, temp, etc

Vibration, flow, temp, etc



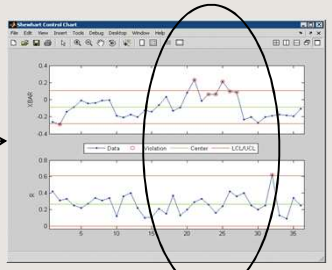
Real-time sensor data

Diagnostic rules engine



Associates deviations with known problems

Robust real-time alerting of impending problems



Analyst

Real-time advisory and action

Questions ...