



# *Virtualization*<sup>™</sup>

**“Bringing Reality to your  
Asset Management”**

By Issam Karkoutli

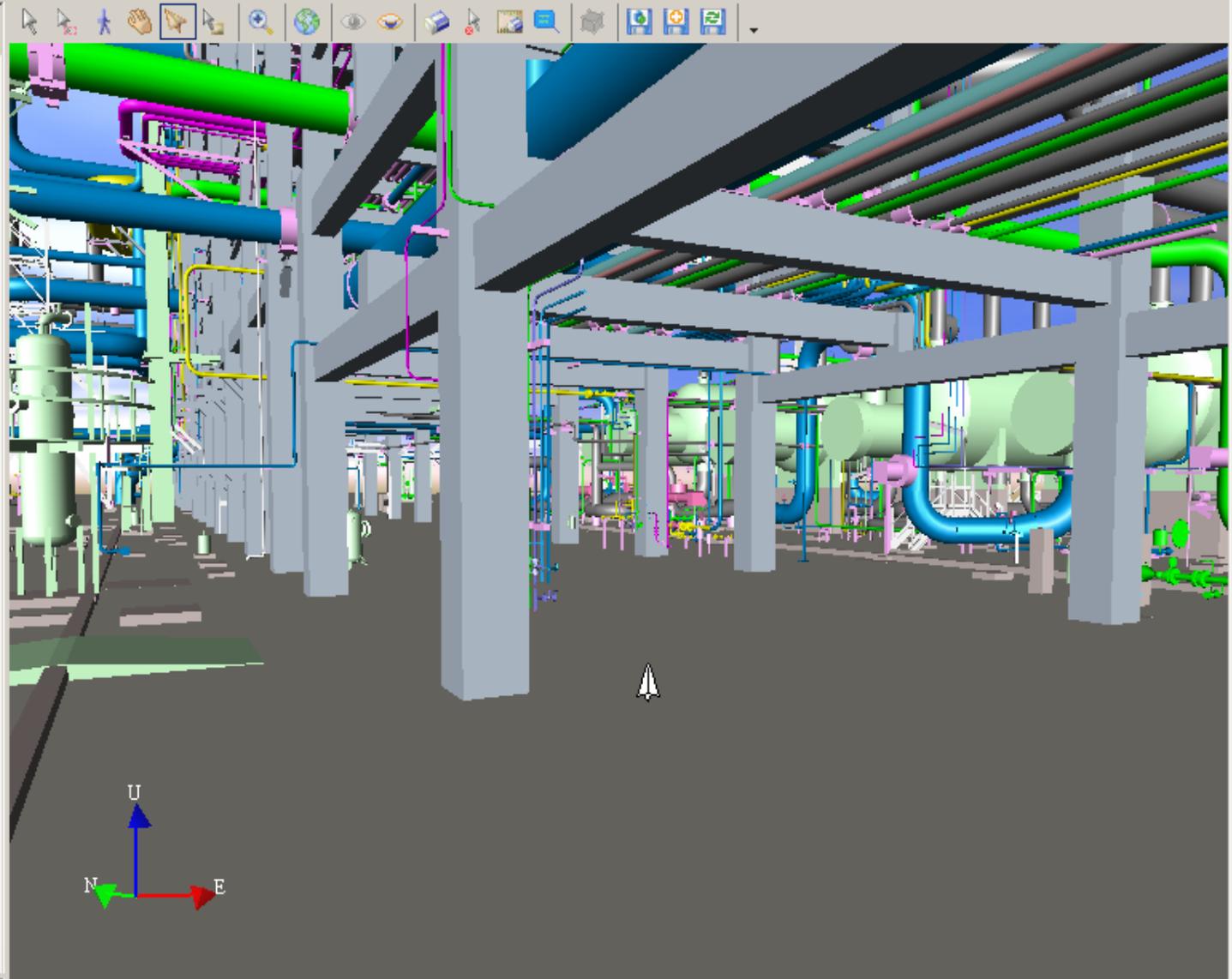


# Agenda

- Solution Overview
- Examples of What can be done
- Software Demo & Case Studies
- Benefits
- Conclusion

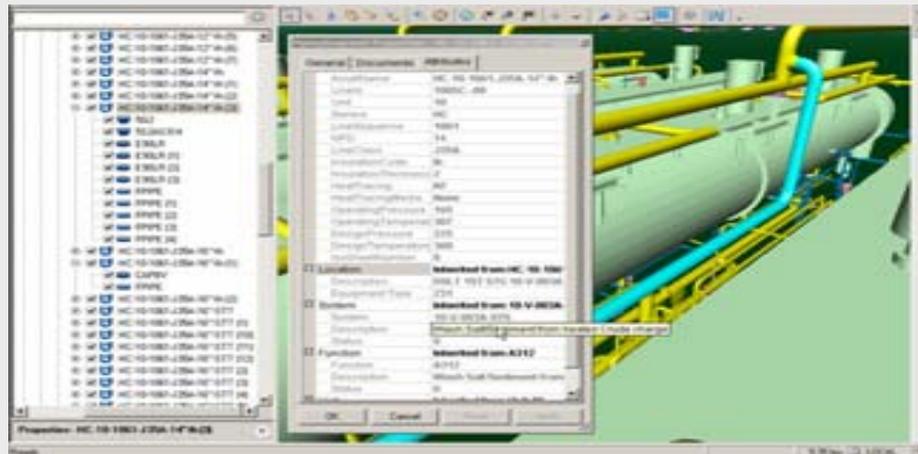
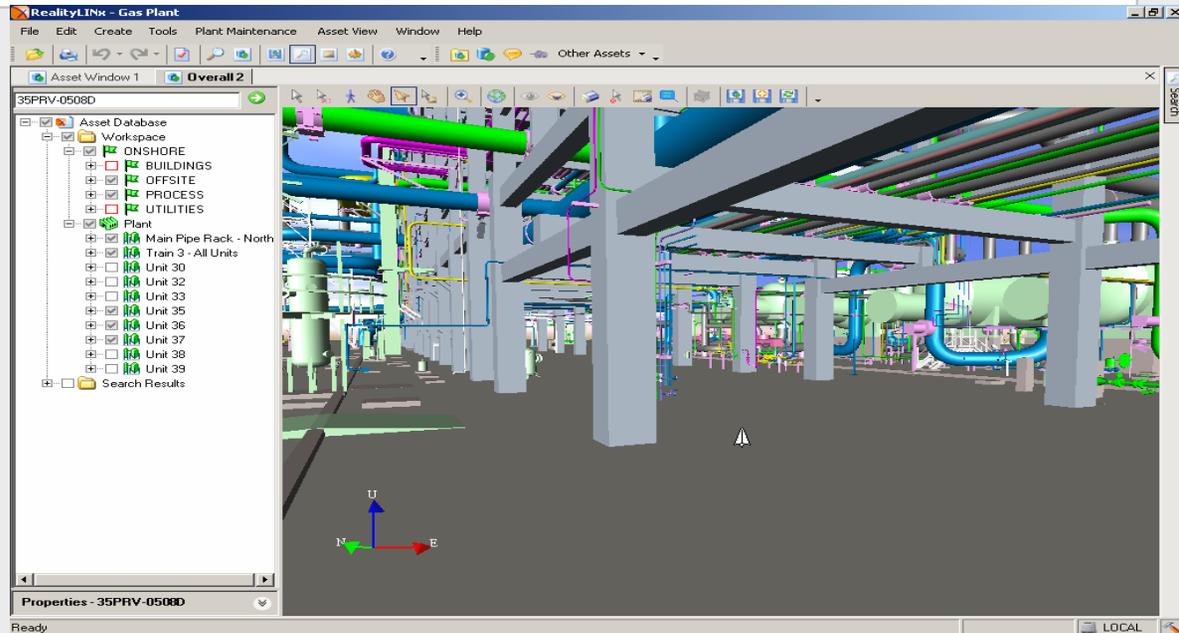
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- Asset Database
  - Workspace
    - ONSHORE
      - BUILDINGS
      - OFFSITE
      - PROCESS
      - UTILITIES
    - Plant
      - Main Pipe Rack - North
      - Train 3 - All Units
        - Unit 30
        - Unit 32
        - Unit 33
        - Unit 35
        - Unit 36
        - Unit 37
        - Unit 38
        - Unit 39
    - Search Results

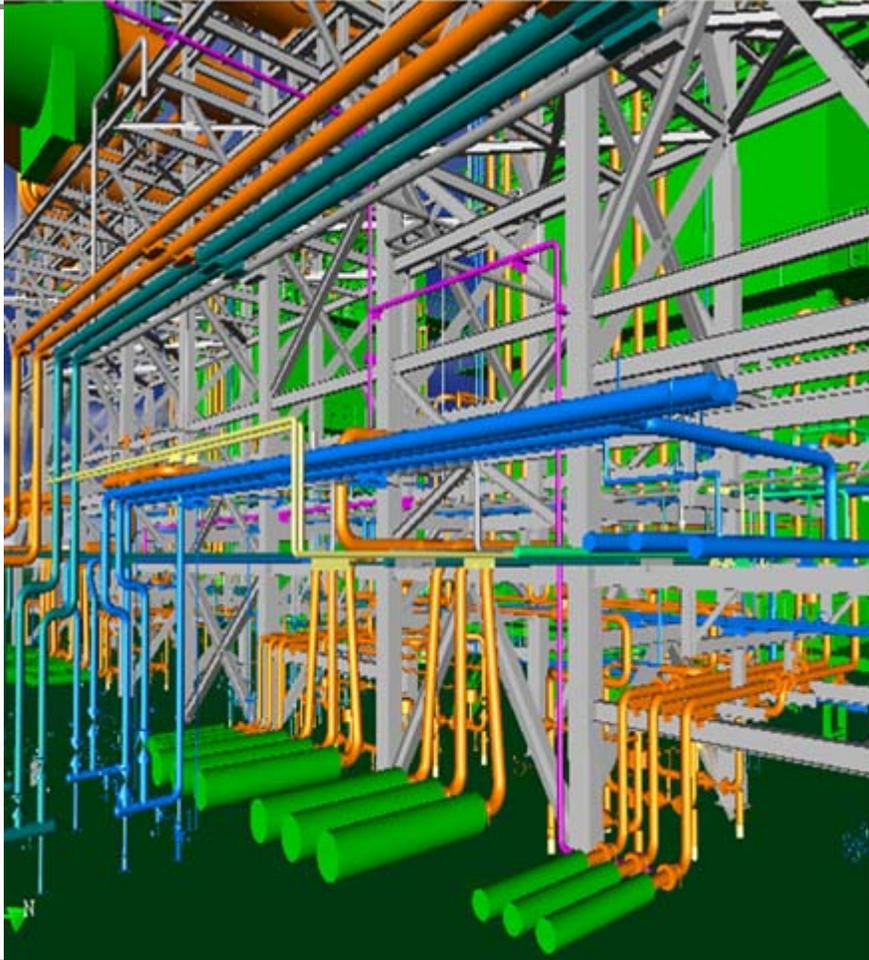


# Virtualization

- A way to walk through your plant while sitting in your office
- Enables you to access everything you know about your assets in just “one-touch”



# New Plants – EPC Design Model



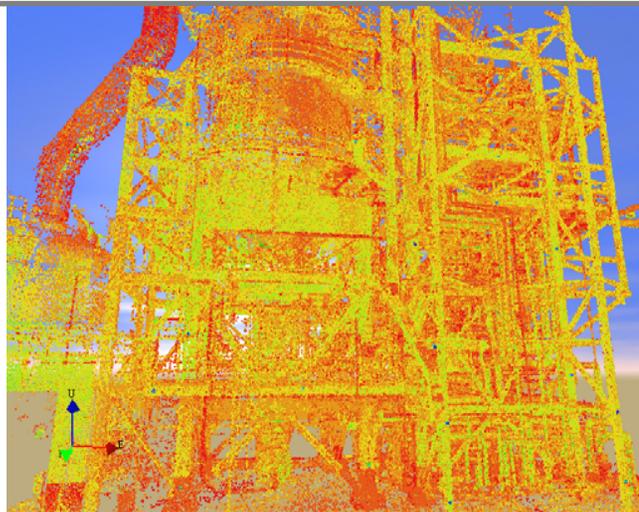
## Intelligent 3D Models

Ready to be  
integrated with  
asset data  
systems

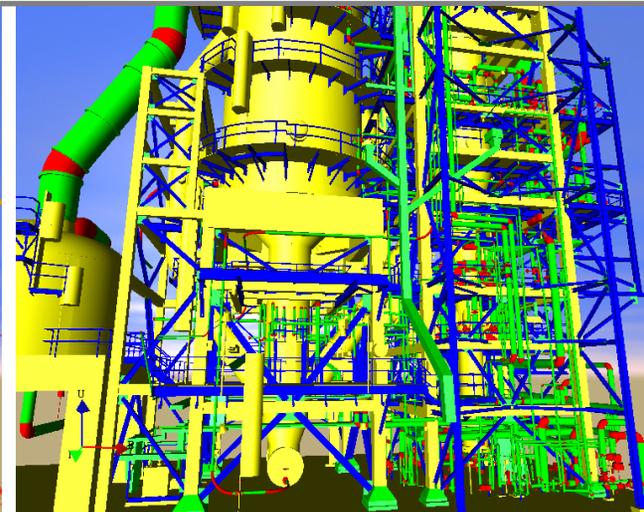
# Old Plants - Laser Scanning



**Capture As-Built Data**  
Using 3D Laser Scanning



**3D PlantLINx Software**  
Converting Laser scans into  
3D models



**Intelligent 3D Models**  
Ready to be integrated with  
asset data systems

# Over 250 Success Stories



ارامكو السعودية  
Saudi Aramco

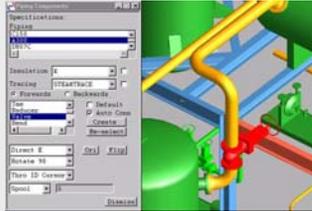


# Need for a Game Changer!

- Document based approach is not enough.
- Tag-based approach is needed for more efficient access to data and documents
- Virtualization can provide a simple and easy access to plant data for engineering, operation, inspection and maintenance applications
  - Easy to understand and use
  - Provides level of detail to match specific needs of the job
  - Standardized and simplified method to access all “physical data”
  - Change Management is ensured over the long run
  - Efficient knowledge capture and transfer methods

# Virtualization as an Anchor Point

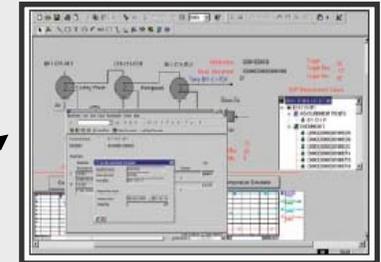
As-Built Data



Inspection Data



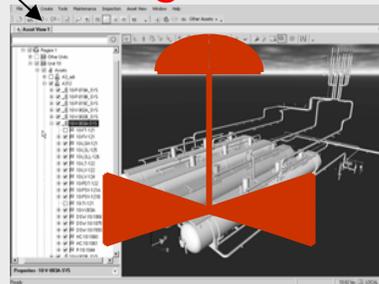
Operation  
(DCS / PI)



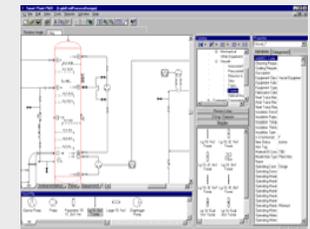
Engineering  
Drawings



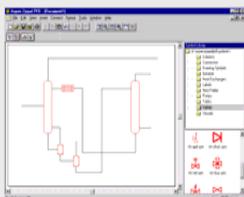
Tag Based



Operation Safety  
Procedures



Intelligent P&ID



Maintenance

# Example Solutions

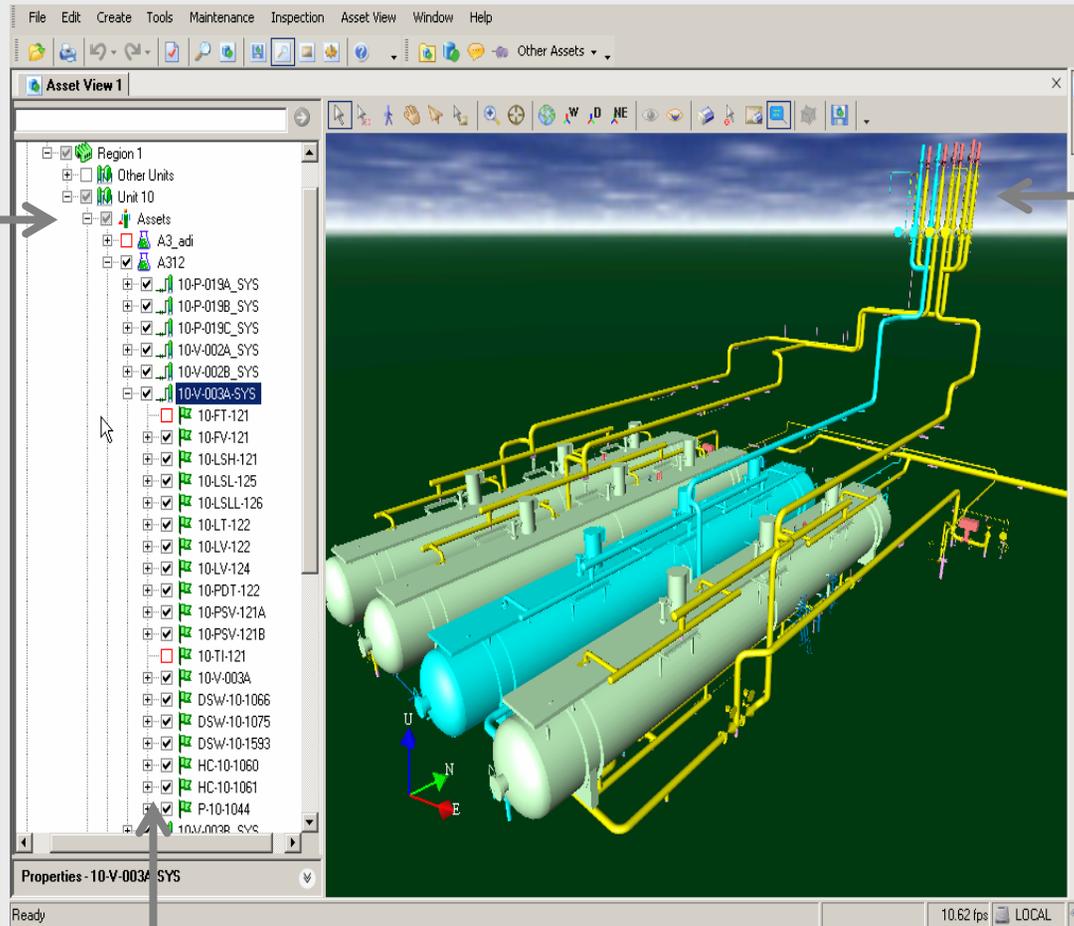
Maintenance - SAP PM

Reliability - Meridium

# Simplicity of the solution



Certified Interface



1

Based on SAP's Functional Location / Equipment Number hierarchical structure, link / organize your assets 3D model data in INOVx's RealityLINx 3D Visualization software

3

Navigate your assets right from your desktop: review line attributes, take accurate measurements, review adjacencies and access safety and operational procedures

2

Search / click on a Functional Location in the tree to view its physical location and visa versa

# Quick Access to Assets Master Records

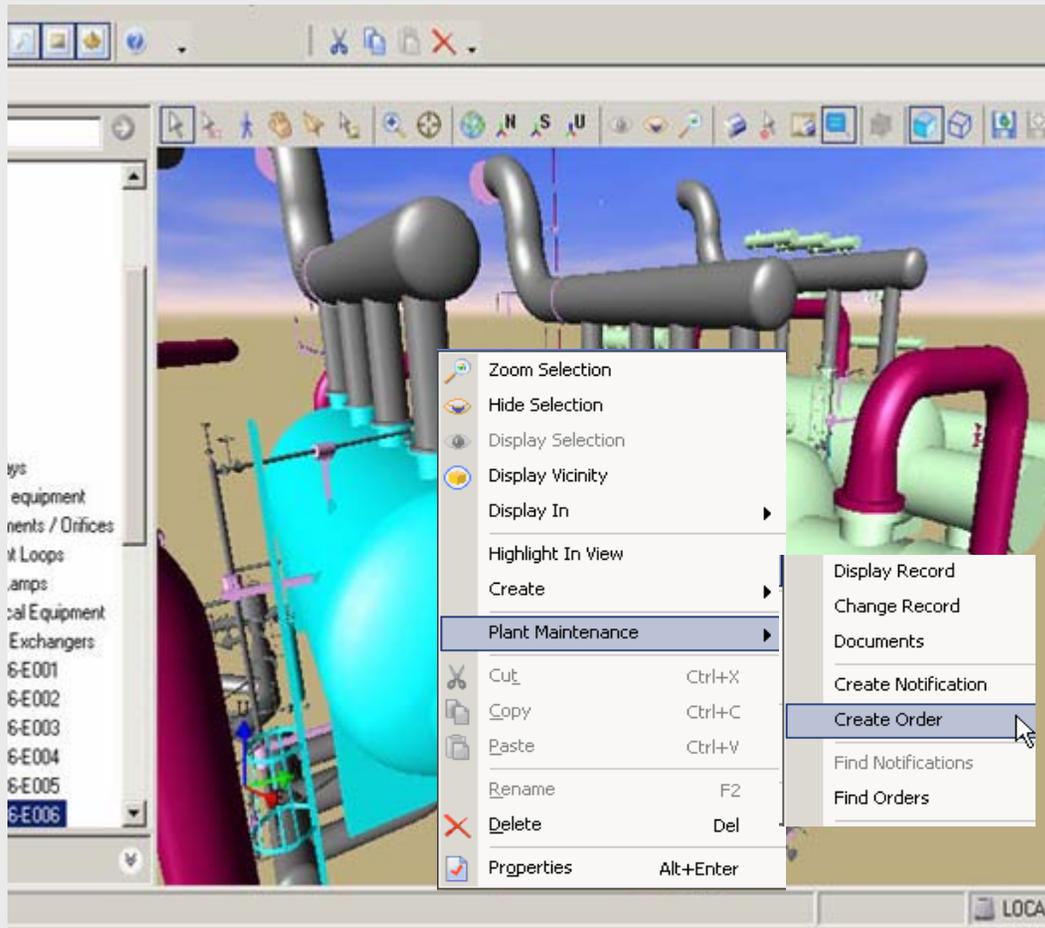
The screenshot displays the SAP Asset View 1 interface. On the left, a tree view shows the asset hierarchy: PROCESS (00, 10, 30), TRAIN3 (32, 33, 34, 35, 36), Cable Trays, Electrical equipment, Flow Elements / Orifices, Instrument Loops, Lights / Lamps, Mechanical Equipment, and Heat Exchangers (36-E001 to 36-E006). The 3D model on the right shows a chiller pump with various pipes and tanks. A properties window for asset 36-E006 is open, showing the following data:

Equipment	PUMP-1	Category	M	Machines
Description	Chiller Pump 1	Intern.note		
Status	AVLB	0001		
Valid from	09/21/2000	Valid to	12/31/9999	
General Location Organization Structure				
General data				
Class				
Object type	3000	Pump		
AuthorizGroup	3000	MAINTENANCE		
Weight	500	KG	Size/dimension	
Inventory no.	10000125	Start-up date	03/28/2000	
Reference data				
AcquisValue	150,000.00	USD	Acquistn. date	01/14/2000
Manufacturer data				
Manufacturer	International Pumps	ManufCountry	MX	
Model number	P10025	Constr.yr/mth	1999 / 06	
ManufPartNo.	100234			
ManufSerialNo.	0001012345			

Right click on asset in 3D or in F/L tree to review SAP PM Data

- Access SAP PM data and records more intuitively while reviewing the actual plant physical layout in 3D.
- Assists technicians during training who are less-familiar with the facility to identify assets.
- Easier for maintenance and operation staff to access and use SAP, and therefore they would keep SAP more current and useful.
- Encourage full leverage and utilization of all SAP PM functionalities across the entire organization.

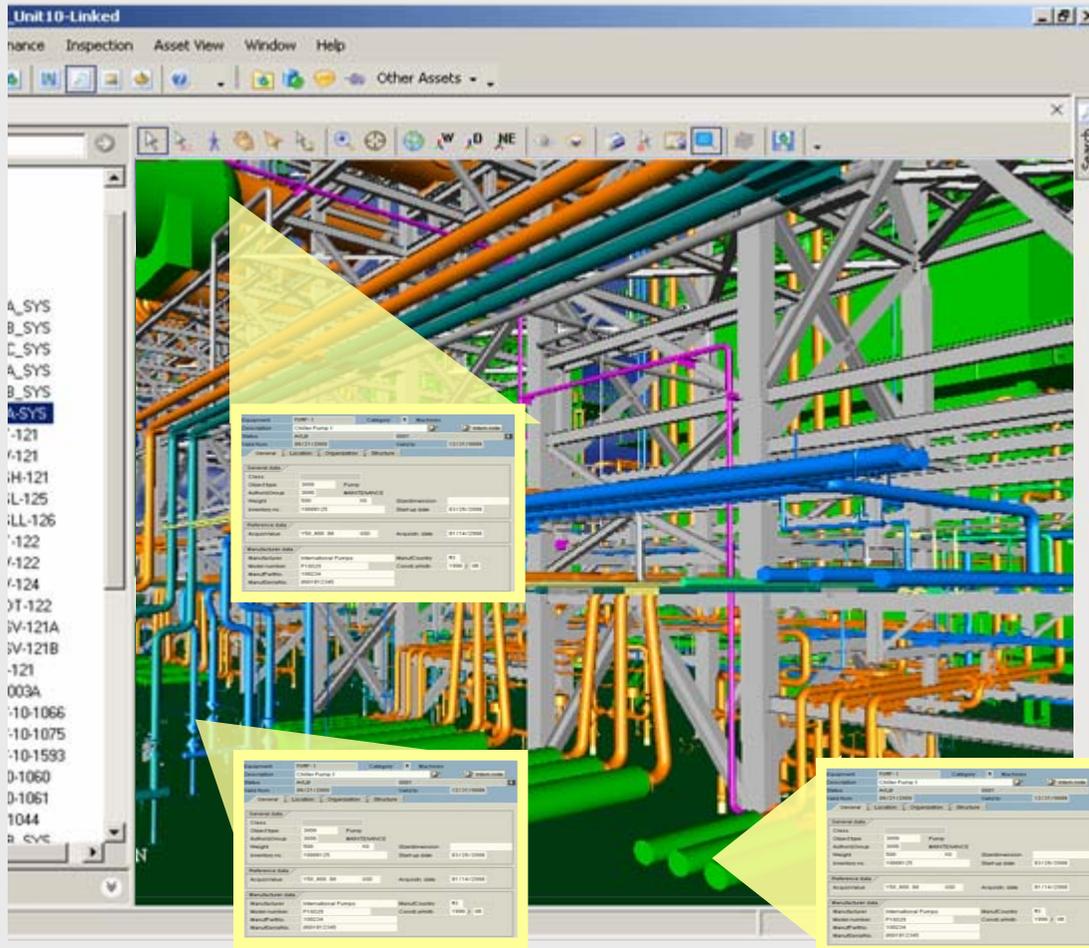
# Create / View Work Orders & Notifications



- Use RealityLINx to physically locate assets. Identification of assets from their physical location. Location of objects in the proximity of a known object. Access/modify data within SAP for any of these objects, once they are located.
- Create, modify and view all work orders and notifications by clicking on the asset's 3D object.
- Simplified work order entry will make SAP data less susceptible to errors caused by casual users.
- Encourage non-maintenance personnel (i.e. operation) to create work orders and notifications more intuitively.

Right Click on the asset in 3D or in the tree to create, or review work orders and notifications

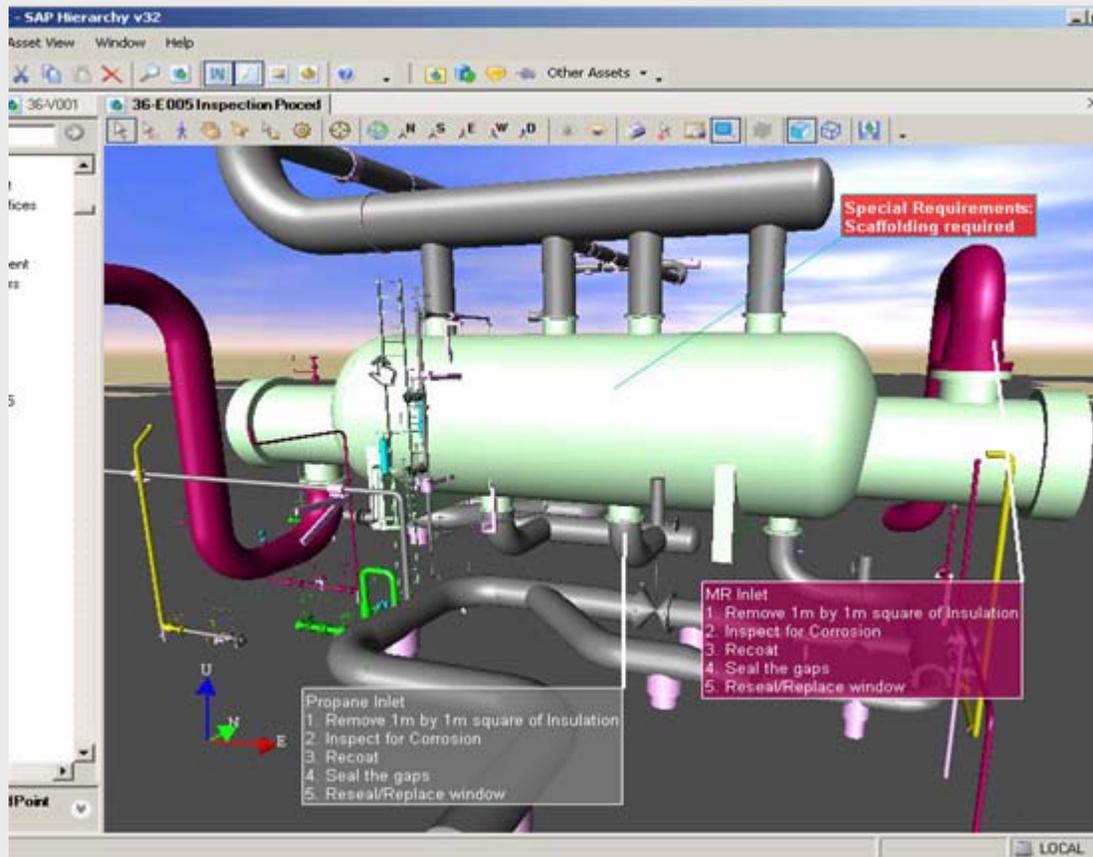
# Color-Code 3D Model by W/O's & Notifications



- Color-code & view SAP w/o's by schedule, by criticality, by type or by field requirements such as scaffolding & special equipment.
- Color-code / review geographical locations of w/o's and determine best PM route.
- Improve the efficiency of scheduling daily activities and logistics.
- Review confined space requirements.
- Clearer, faster planning and communication between operation, maintenance and field staff.

Execute SAP queries to color-code or highlight all equipment that have outstanding w/o's due within a user-specific period (i.e. 2-week look ahead)

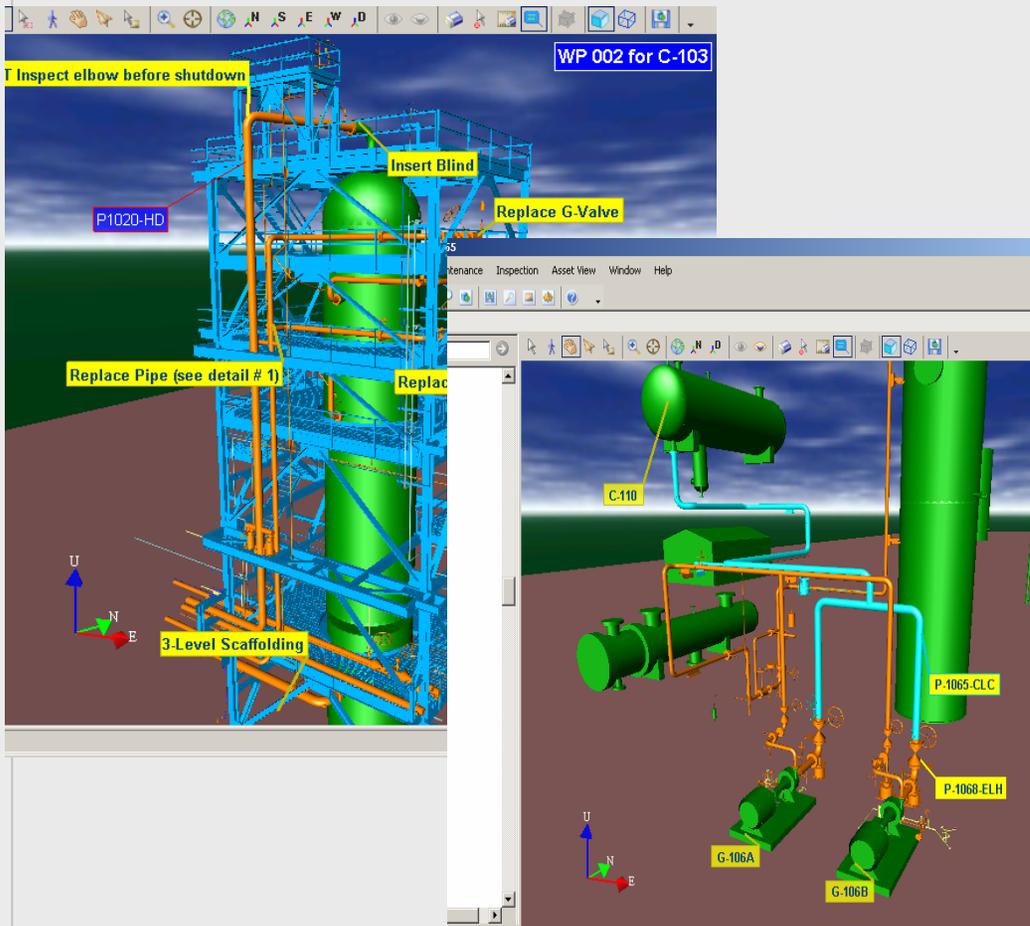
# Create Work Permits / Clearance Templates



Right Click on the asset in 3D to create, or review w/o's and notifications to SAP.

- The 3D model facilitates easy methods to create / re-use work permit templates which can be linked to SAP.
- Document / review operational procedures, isolation points, startup sequencing, and special instructions.
- Capture equipment specific knowledge from experienced plant personnel into templates.
- Access safety, tag out / lock out requirements.
- Post job documentation – cause codes for future failure analysis.
- Faster and better field work coordination / execution.

# Shutdown / Turn Around Applications



- Define a clear work scope for each work package with a corresponding w/o's in SAP.
- Review scope internally (i.e. HAZOP & Safety review with Operation, Maintenance)
- Produce drawings for contractors / work permits.
- Review and familiarize contractors with assets.
- Optimize & review sequence of events by: schedule, contractor, geographical area, requirements, constructability studies.
- Shut-down / Start-up sequencing.
- Hydrotest packages - boundary definition and blind locations.



# **INOvx RealityLINx Interface with Meridium Thickness Monitoring**

# RealityLINx Software Demo & Case Studies

# Benefits & Impact

- **Enable plant staff to consider physical situation before performing any field task**
  - Perform a task quicker
  - Understand the constraints, from location to clearance issues
  - Be fully aware of safety considerations
  - Avoid hunting for equipment and potential for mistakes
  - Get access to all associated and relevant data without the need for a new interface
- **Expect the initial impact will be on:**
  - Turnaround planning and execution
  - Field maintenance daily task planning and coordination with Operation
  - Operator training and certification
  - Inspection and Reliability
  - Safety and HAZOP coordination
  - Disaster preparedness
  - Incident analysis and root cause determination

# Summary of Benefits

Improves the **effectiveness** of the operations, inspection, and maintenance:

- Broad benefits across all RealityLINx users, with average time savings of 2 hrs/day per user
- Improved business processes due to overall personnel efficiency
- Enhanced communications among teams reducing errors and rework

Enhance **safety & reliability** by providing asset information from accurate as-built:

- Optimized and integrated inspection and corrosion program
- Accurate maintainable isolation device location drawings
- Enhanced Safety & change management procedures - Emergency Response Preparedness

**Knowledge Base** for future generation:

- Support frequent changes in staff and contractor personnel
- Effective approach to on the job training - enable new staff to call up and see plant and data faster, color coded systems, RV's, etc.
- Knowledge capture for less experienced staff

# Our Proposed Approach

Use 3D Virtualization as an “Anchor” point to reality:

- It is simple to grasp and easy to use by all staff
- Documents & data are a function of the asset tag numbers – “one-touch” concept
- Integrated with existing systems
  - SAM PM, DMS, Maximo Meridium, OSISoft PI, DCS systems, Operation Procedures, etc.
- Sustainable: Change management is self-regulated and efficient – change it once and view by all

# Conclusion

- Virtualization enables us to operate complex facilities better:
  - More Reliably
  - More Efficiently
  - More Safely
  - With Greater Knowledge
- New Facilities
  - Ready for immediate adoption of virtualization
- Existing Facilities
  - Enabling technology – Laser scanning to create virtual model

**Thank You**