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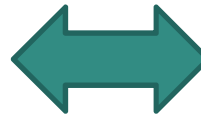
# Enterprise Asset Management & Asset Integrity Management Introductions

May 2017

## Enterprise Asset Integrity Management systems:



- High technologies;
- Modern equipment;
- Complex operations;
- High efficiency;
- Etc.



- Serious Impacts;
- Complex Inspections;
- Complex Maintenances;
- Complex Managements;
- Etc.

**Enterprise AIM System is the Solution**



## Enterprise Asset Integrity Management systems:

### CAPEX

- Design;
- Procurements;
- Construction;
- Installations;
- Commissioning;
- Transferring;
- Etc.

**03 – 05 years time.**

### OPEX

- As-Built;
- Inspections;
- Maintenances;
- Repairs/Replaces;
- Expansions;
- Retrofit;
- Etc.

**20 – 30 years time.**



# Enterprise Assets Managements



## Enterprise Asset Integrity Management systems:

CAPEX

OPEX

Designs

As-built

Analyses & Calculations

Current Operations

Materials

Inspections

Fabrications

Maintenances

Construction

Retrofit

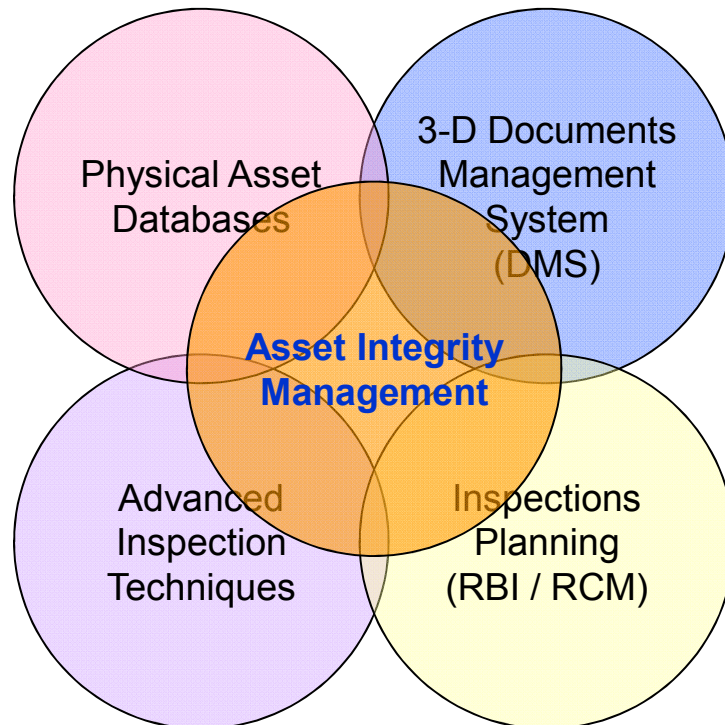
Commisionning

Expansion



Enterprise AIM System is the Solution

## EAM Solutions:



- EAM & AIM Systems Consulting:
  - ✓ Design phase Solutions;
  - ✓ Operation phases Solutions.
- EAM & AIM Palladio software:
  - ✓ Laser Scanning input;
  - ✓ 3D plant model;
  - ✓ Corrosion Analyses
  - ✓ Inspection Management;
  - ✓ Technical 3D DMS;
  - ✓ Risk-Based Inspection (RBI);
  - ✓ Reliability Centered Maintenances (RCM).



## EAM Solutions – Project Phases:

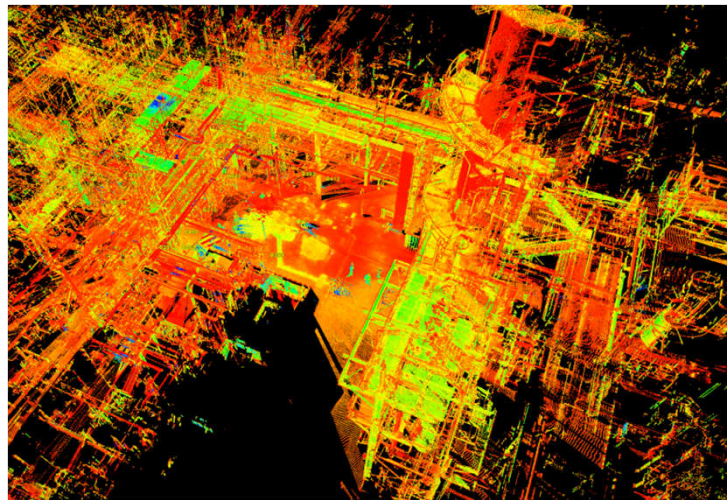
- Project Facilities Databases establishment & setup;
  - ✓ Project & Design bases;
  - ✓ PFD & P&IDs;
  - ✓ Equipment Specifications Datasheet;
  - ✓ Equipment relevant documents & drawings;
- Advanced Databases:
  - ✓ E-Document Management System (e-DMS)
  - ✓ PDMS 3D Model;
  - ✓ Computerised Maintenance Management System (CMMS);

How to make these integrated & updated during the next Operational phases??



## EAM Solutions – Operation Phases (1/2):

- Laser Scanning:
  - ✓ Leica P20 laser scanner
  - ✓ Leica TS09+ high accuracy total station
- Point Cloud processing:



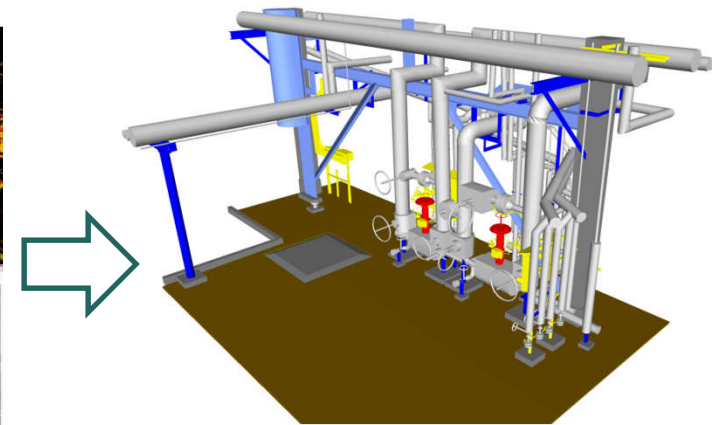
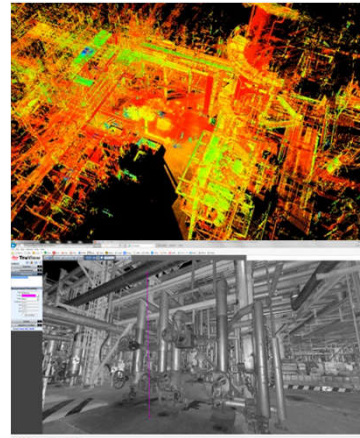
3D Laser Scan Data



TruView – 2D Panoramic Point Cloud

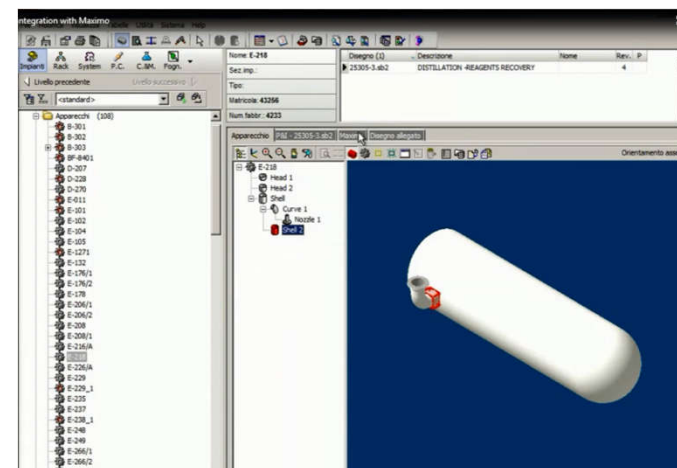
## EAM Solutions – Operation Phases:

- Integrated scanned models into the existing PDMS Model:



3D As-Built Model

- Integrated into the EAM Databases:
  - ✓ Palladio Software;
  - ✓ Updated operational data.



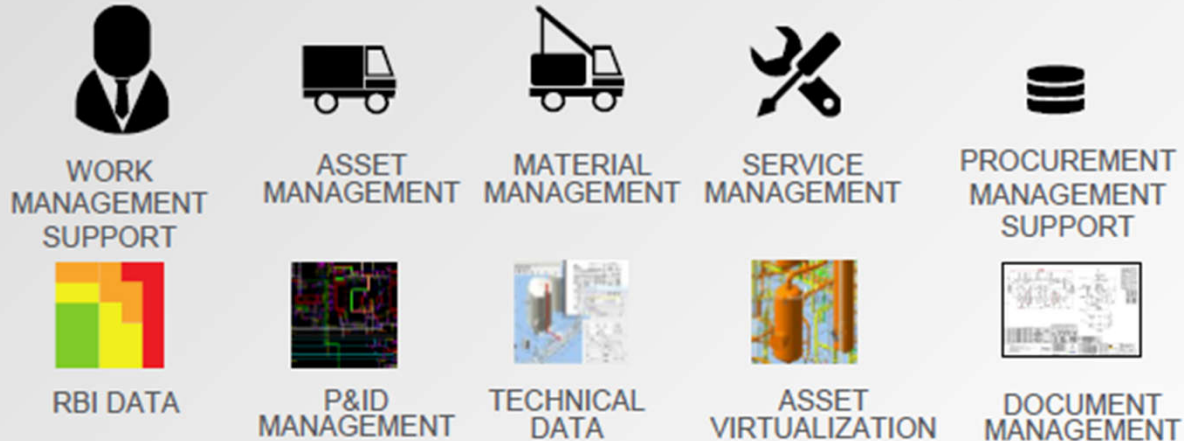
Operational data for specific equipment





## BENEFITS

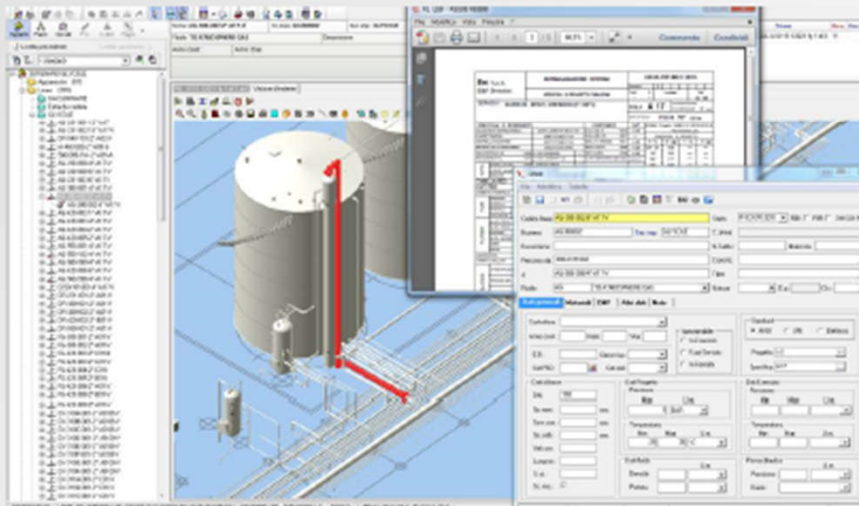
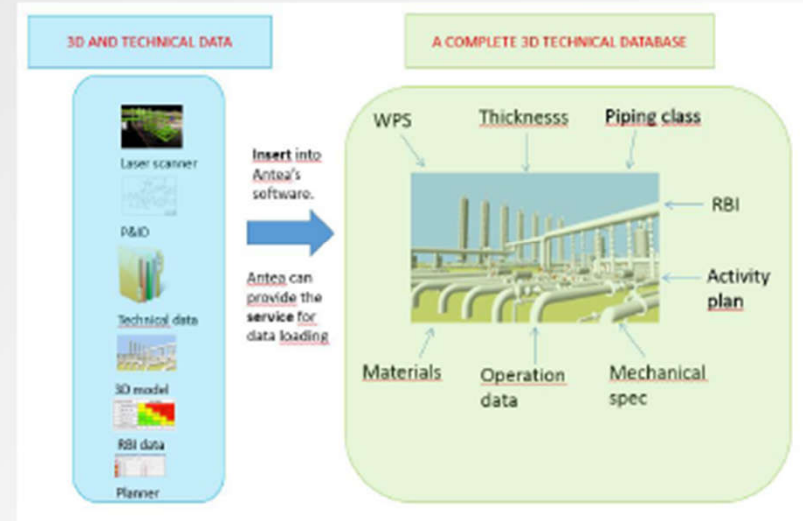
Palladio can offer different kind of services to the final user of the plant :



- **Fast and cheap population** of the database as a result of the automatic extraction of data from the P&ID
- **Short learning curve** due to a faster and more intuitive navigation using the P&ID and 3D model
- **Improved staff productivity** due to faster information search and retrieval
- **Improved communication** between technical staff - misunderstandings are avoided by using 3D visualisation
- **Palladio can be used as viewer** for the P&ID , 3D model and laser scanner; it can be also connected with external Solutions, like SAP, Maximo, etc...
- **Reduced insurance premiums** due to the user-friendly display and complete risk and integrity status of the plant

## 3D TECHNICAL PLANT DATABASE

- Obtain technical information easily through the 3D model of the plant.
- Attaching technical documents of each item to each level (equipment, shell, nozzle, flange, valve, instrument).
- Keep the technical documentation well organized and easy to find.



- Manage P&ID and the Technical document status easily.
- Share various operational data on multiple sites.
- Programming the maintenance from the office (scaffoldings, spare parts, operation..)

## POINT CLOUD

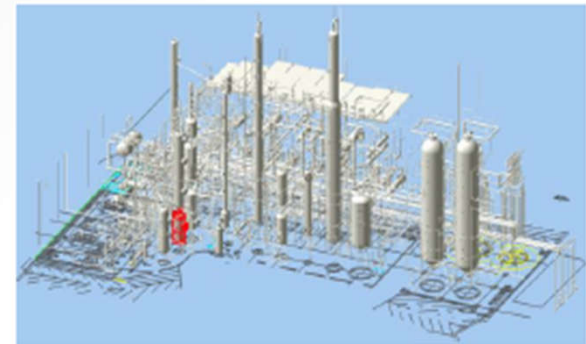
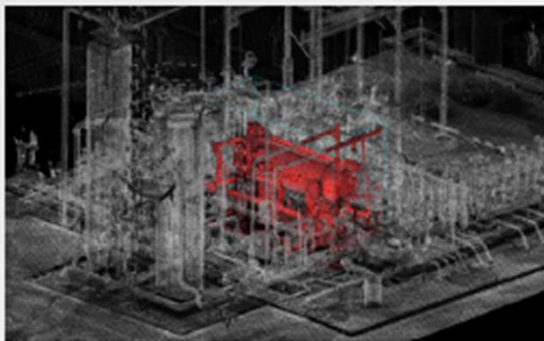
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### 3D Model

All the items can be associated and found in the 3D model. The association of each item can be immediate or depend on the source of the model. The 3D model can be imported, made available and integrated in the system.

### Laser Scanner

If there is any laser scanning pointcloud available , it can be imported and integrated with the 3D model. Each component can be found in its position and information about the surroundings can be obtained.

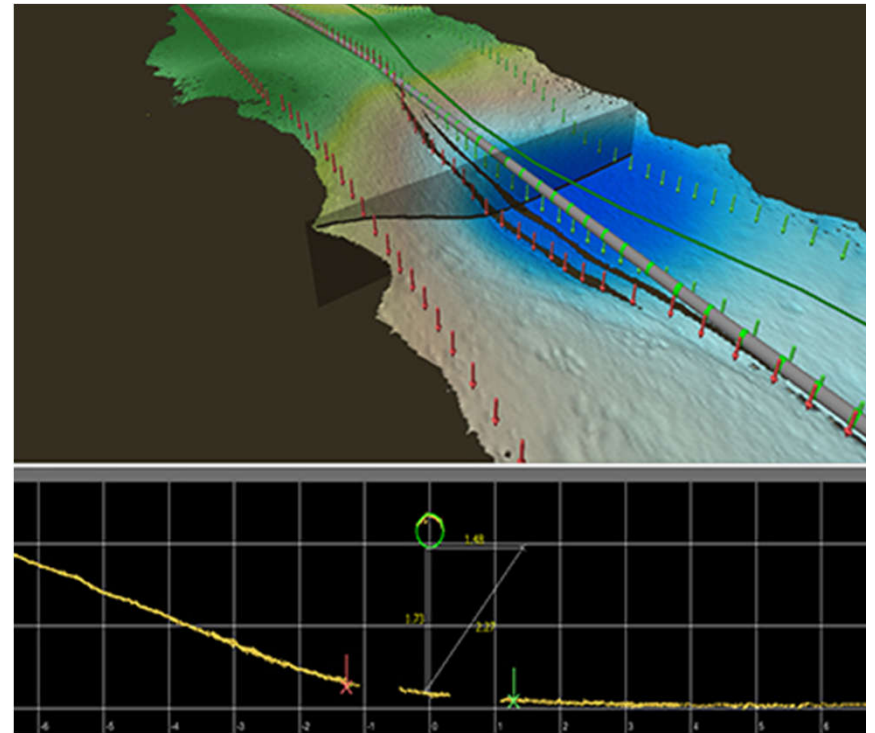
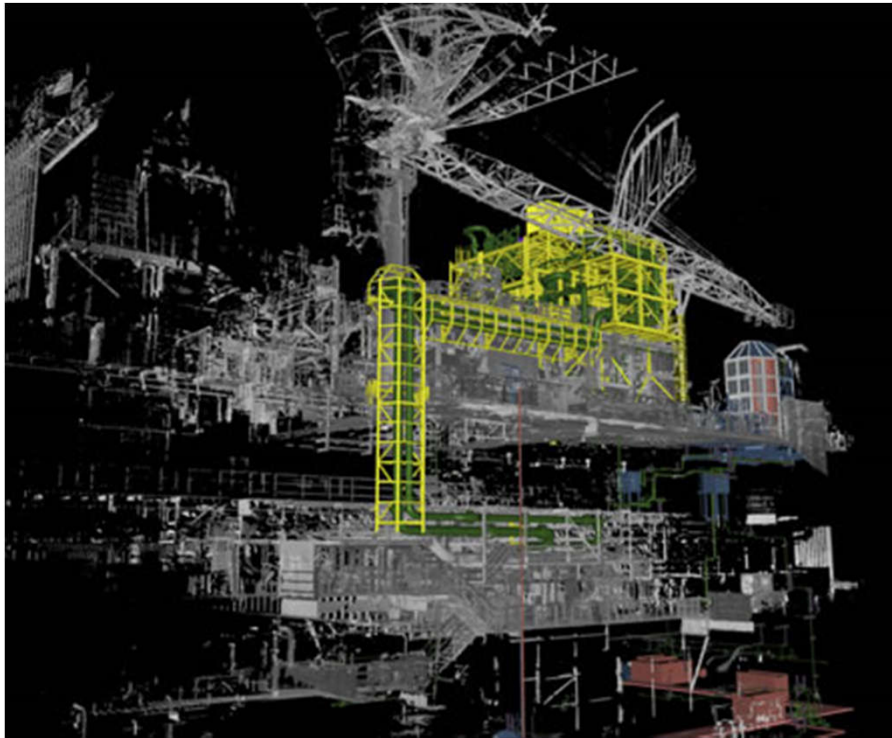




# Palladio Software



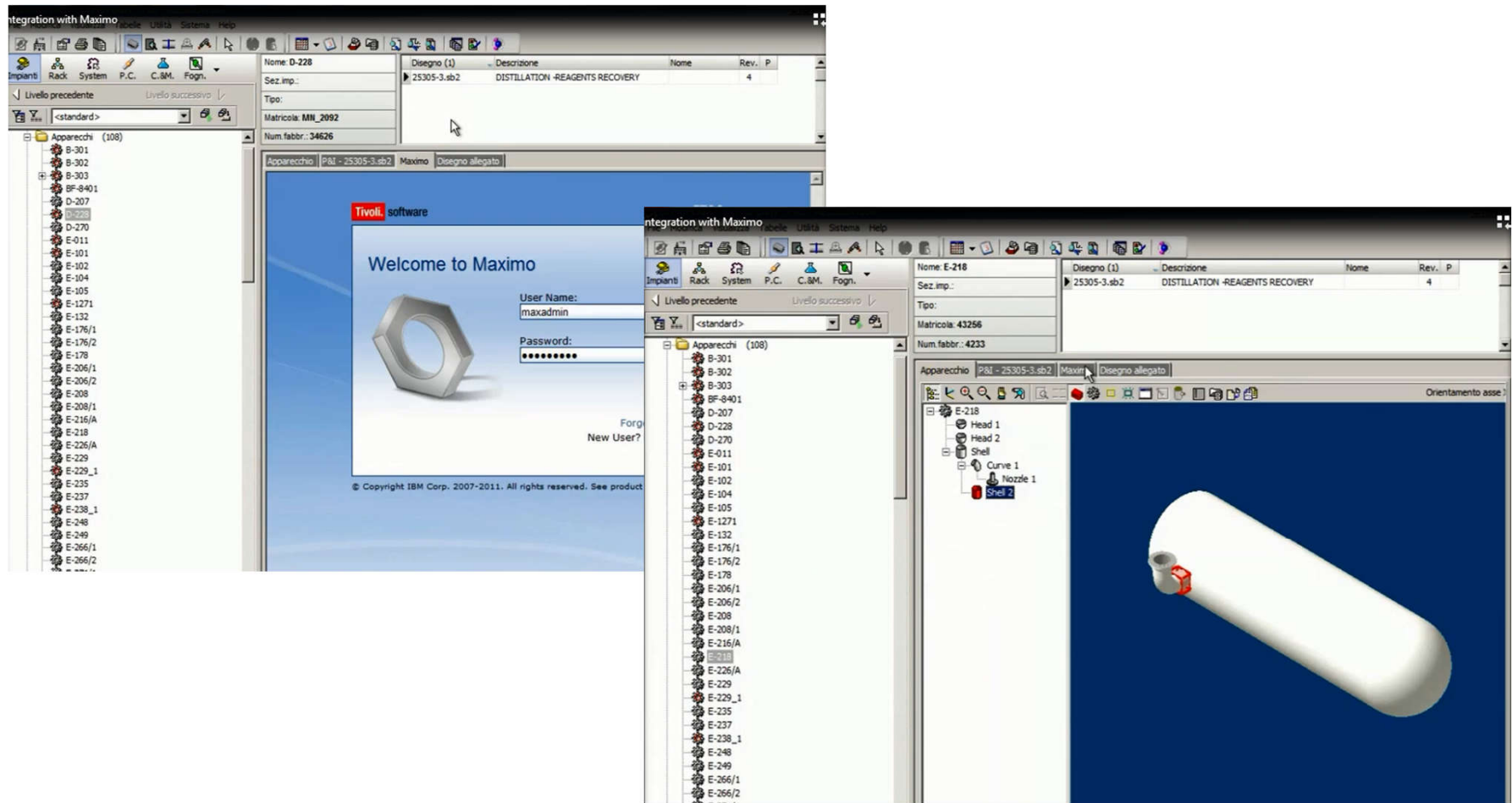
Offshore & Subsea pipelines:



# Palladio Software



Palladio software is fully integrated with EAM software: MAXIMO & SAP environments:



## Partners:

- MIE – Malaysia;
  - ✓ PDMS Design;
  - ✓ Laser Scanning: Technicians & equipment.
- Antea – Italya:
  - ✓ Laser Scanning: Technicians & equipment.
  - ✓ EAM Software Palladio for equipment databases, RBI, RCM, CMMS, etc.



# Discussions

- This software can be integrated and linked with existing MAXIMO: saving time & cost;
- Advanced Technology:

**New technologies seems unnecessary at the beginning!**



Solid                      Reliable  
Right to the purposes  
Easy to use



Messy...                      Unused features  
High costs                      Trainings



**However, finally computers are broadly selected!!**



## REFERENCES



STOGIT



corporate university



IPLOM



SASOL



Karachaganak



D'APPOLONIA

consulting, design, operation & maintenance engineering

lyondellbasell



EniPower

PotashCorp



norge

MEMC



agip kco

EBIC



SARLUX

SARAS

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