The Oil and Gas Interoperability (OGI) Pilot

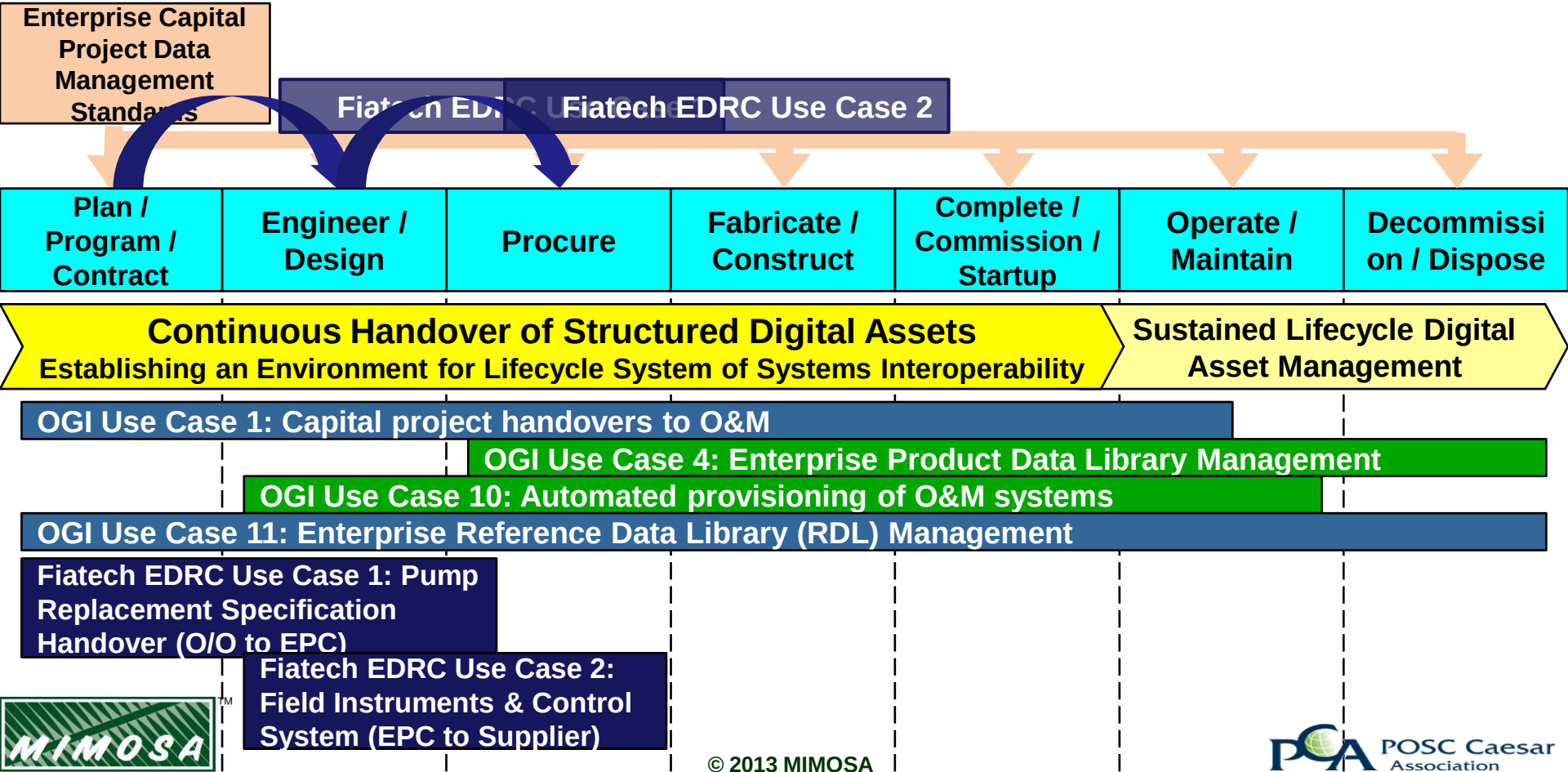
Enabling Sustainable Interoperability for the Oil and Gas Industry

MIMOSA Members Meeting
Applied Technology Publications

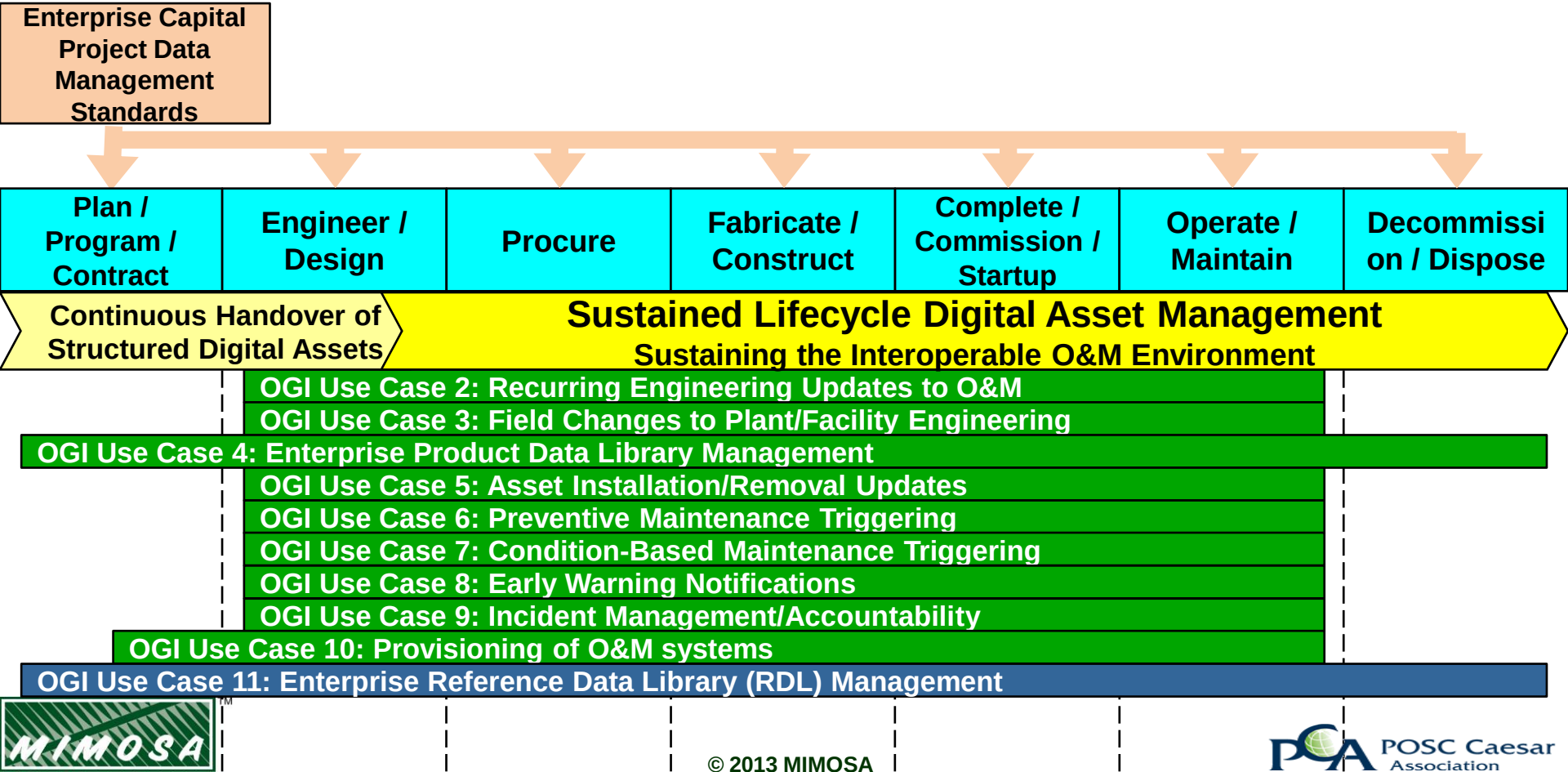
Dec 11, 2013

Alan Johnston
MIMOSA President
ISO TC 184/WG 6 Convener

OGI Pilot Business Use Cases Roadmap - Part 1



OGI Pilot Business Use Cases Roadmap - Part 2



MIMOSA Summary

- Focus on Physical Asset Life-Cycle Management and Facilities O&M
- Develops and publishes industry-driven standards in alignment with ISO
- Officially organized as a 501 c(6) non-profit industry association in 1997
- Membership
  - ✓ Owner/Operators – Oil and Gas, Chemical, Aerospace and Defense Sectors
  - ✓ Suppliers/integrators
  - ✓ Academia/Researchers
  - ✓ Industrial Media
- Founding Member and IP Manager for OpenO&M™ Initiative
- OpenO&M Owner/Operator Leadership Council
- Founding Member Standards Leadership Council

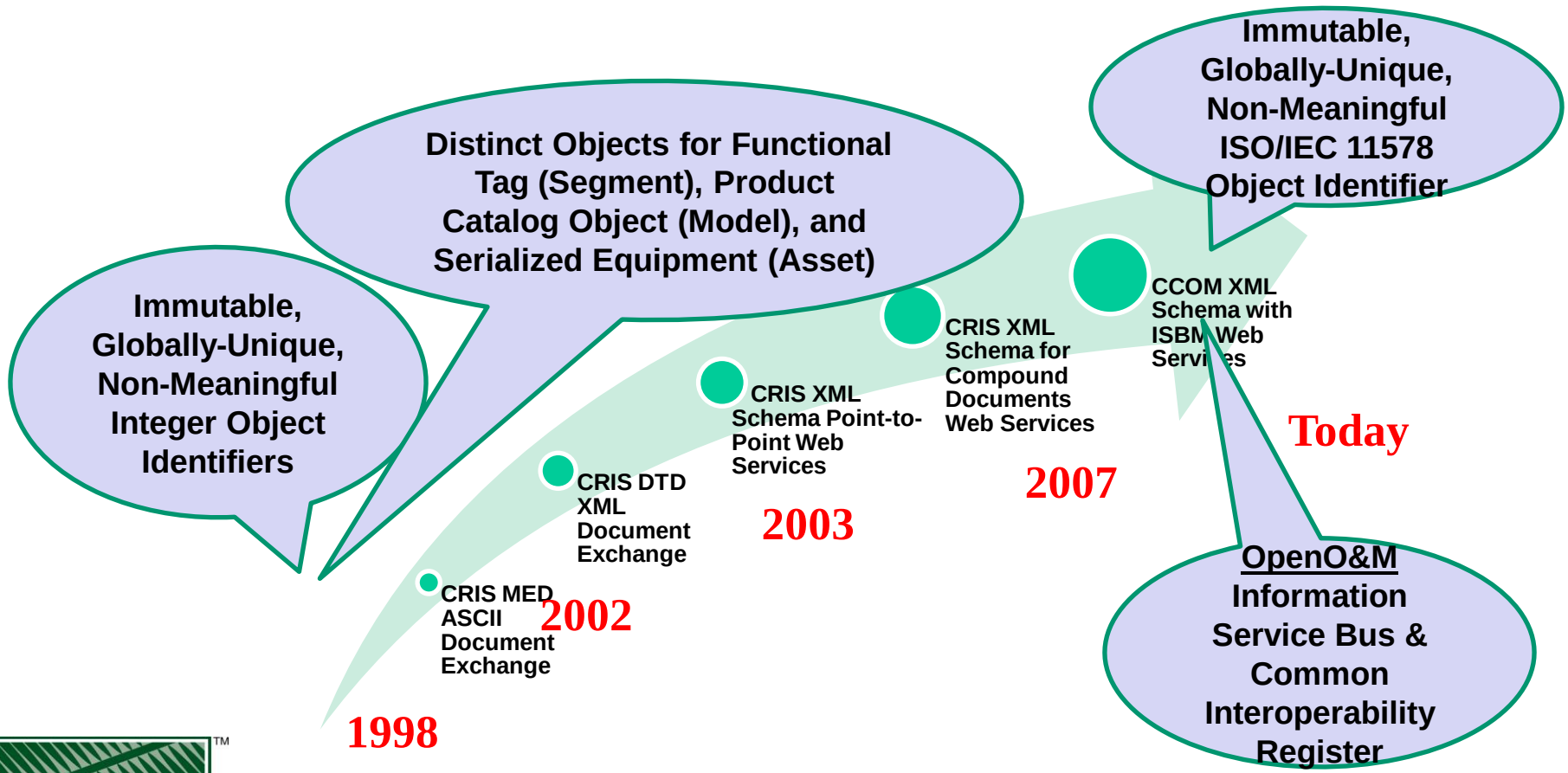
MIMOSA™

Requirements-driven Development of Standards

- MIMOSA has a rich history of developing industry standards which are driven by industry requirements
  - Open Systems Architecture for Enterprise Application Integration (OSA-EAI)-1997
  - Open Systems Architecture for Condition Based Maintenance (OSA-CBM)-1999
  - OpenO&M Information Service Bus Model (ISBM)-2011
  - OpenO&M Common Interoperability Register (CIR)-2011
- MIMOSA works closely with formal standards bodies to help develop international standards reflecting industry requirements
  - ✓ ISO TC 108/SC 5 – ISO 13374 (CBM)
  - ✓ ISO TC 184/SC 5 – ISO 18435 (O&M)
  - ✓ ISO TC 184/WG 6 – Developing ISO OGI Technical Specification

MIMOSA™

MIMOSA CCOM Object Identifier History

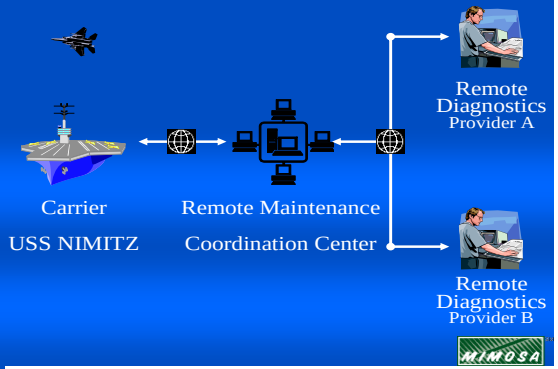


OSA-CBM Dual Use Technology Program - Office of Naval Research

MIMOSA Information Network (MIN)

June 21, 2000
MIN-Viewer
OSA-CBM Presentation
Alan T. Johnston
MIN Project Director

The OSA-CBM MIN Demonstration Concept



MIN-Viewer Segment Navigation 1

User Interface Modeled On The Microsoft Windows Explorer

Army Collaborative Telemaintenance – Army CECOM

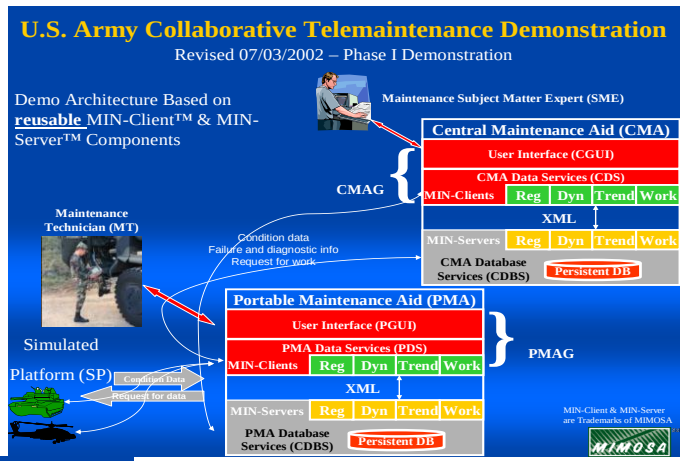
U.S. Army CECOM
Collaborative Telemaintenance Project

Phase I Demonstration Briefing – July 31, 2002

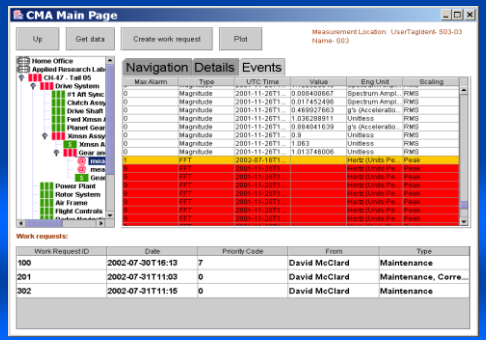
Alan Johnston – MIMOSA
Kenneth Bever – MIMOSA
Bob Walter – Penn State ARL

U.S. Army Collaborative Telemaintenance Demonstration

Revised 07/03/2002 – Phase I Demonstration

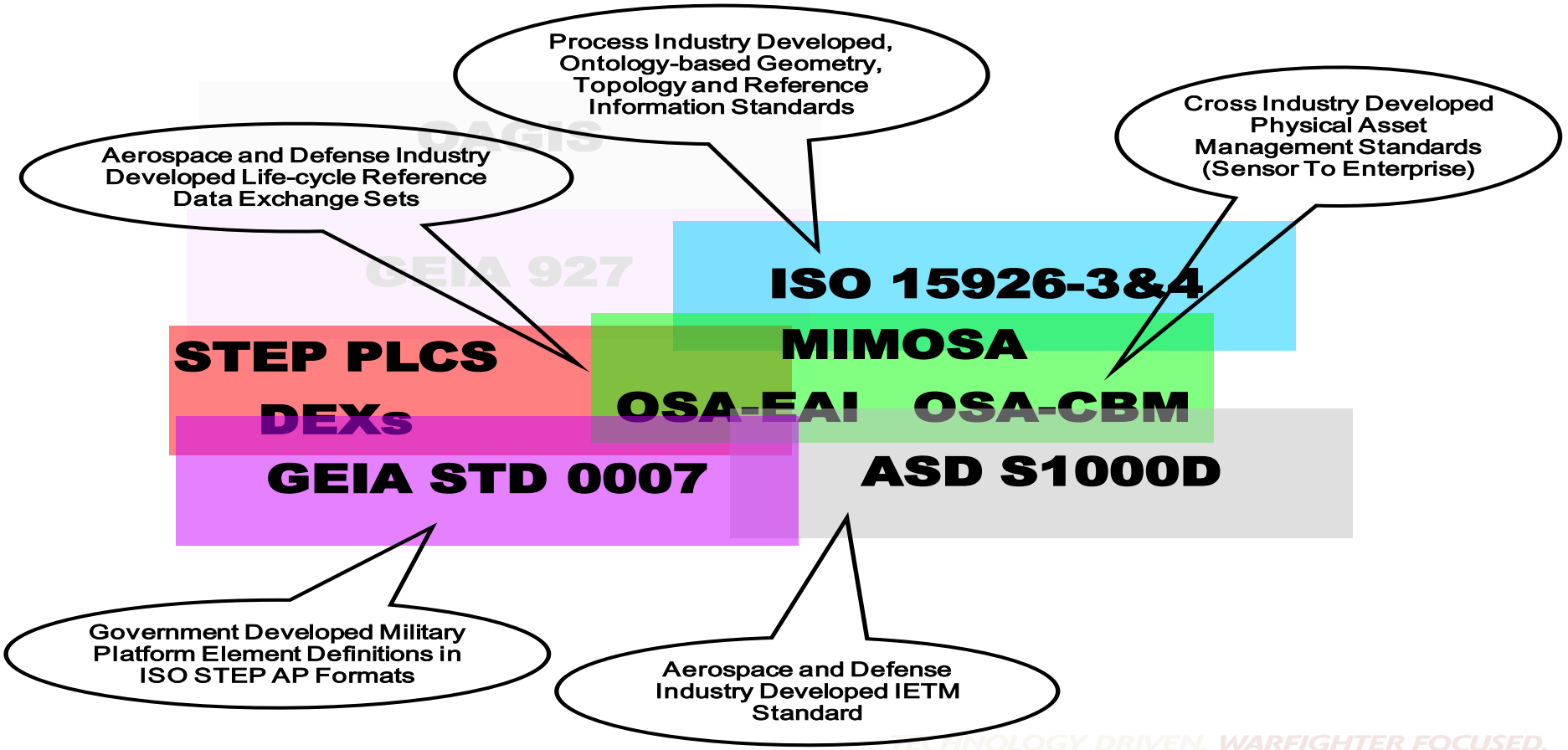


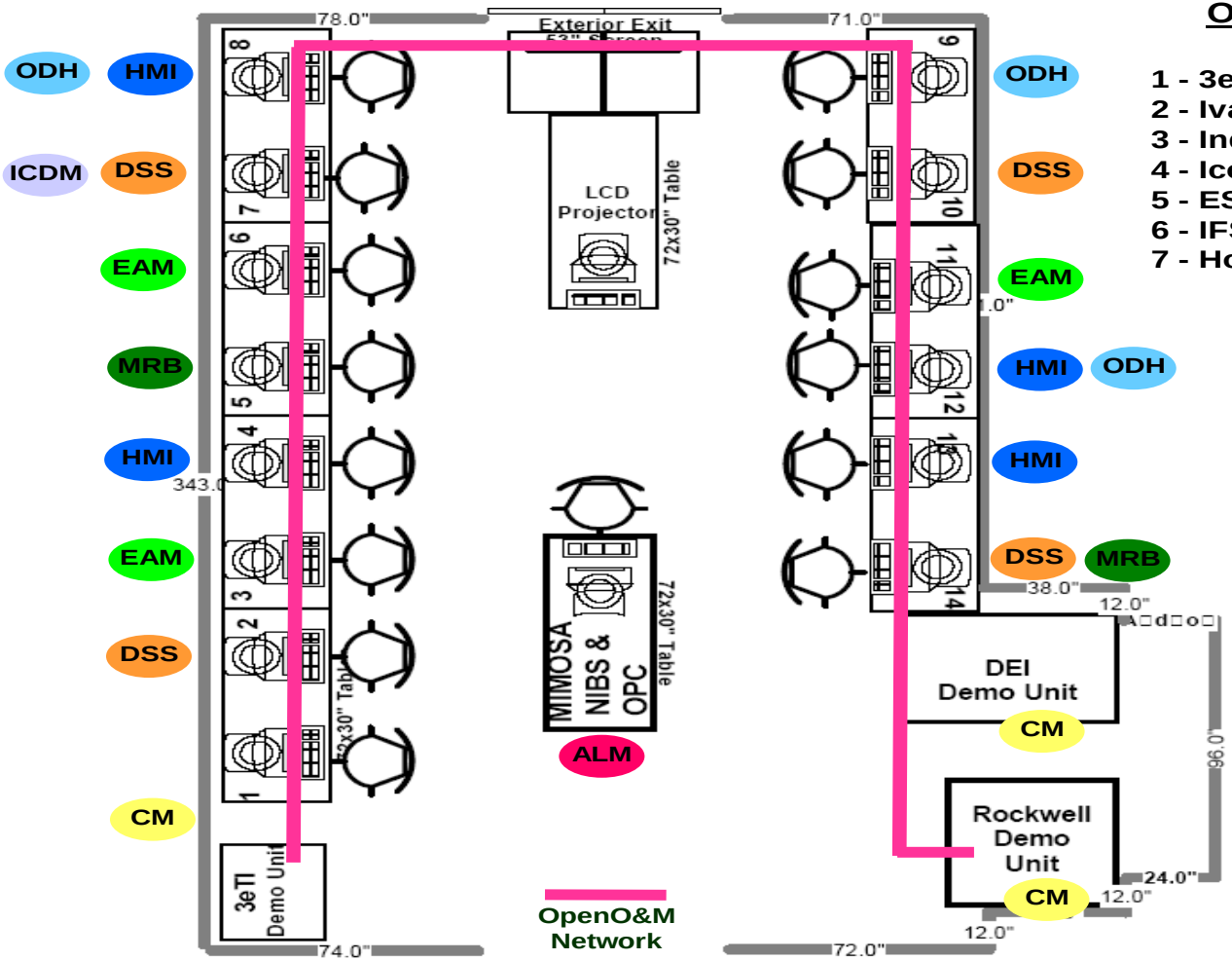
CMA Showing Measurement Events In Alarm



Platform Life-cycle Information Management

Concept Mapping- Aerospace & Defense Industry





Organization Legend

1 - 3eTI
2 - Ivara
3 - Indus
4 - Iconics
5 - ESRG
6 - IFS
7 - Honeywell
8 - AspenTech
9 - Matrikon
10 - PdMA
11 - Synergen
12 - Yokogawa
13 - Rockwell
14 - DEI

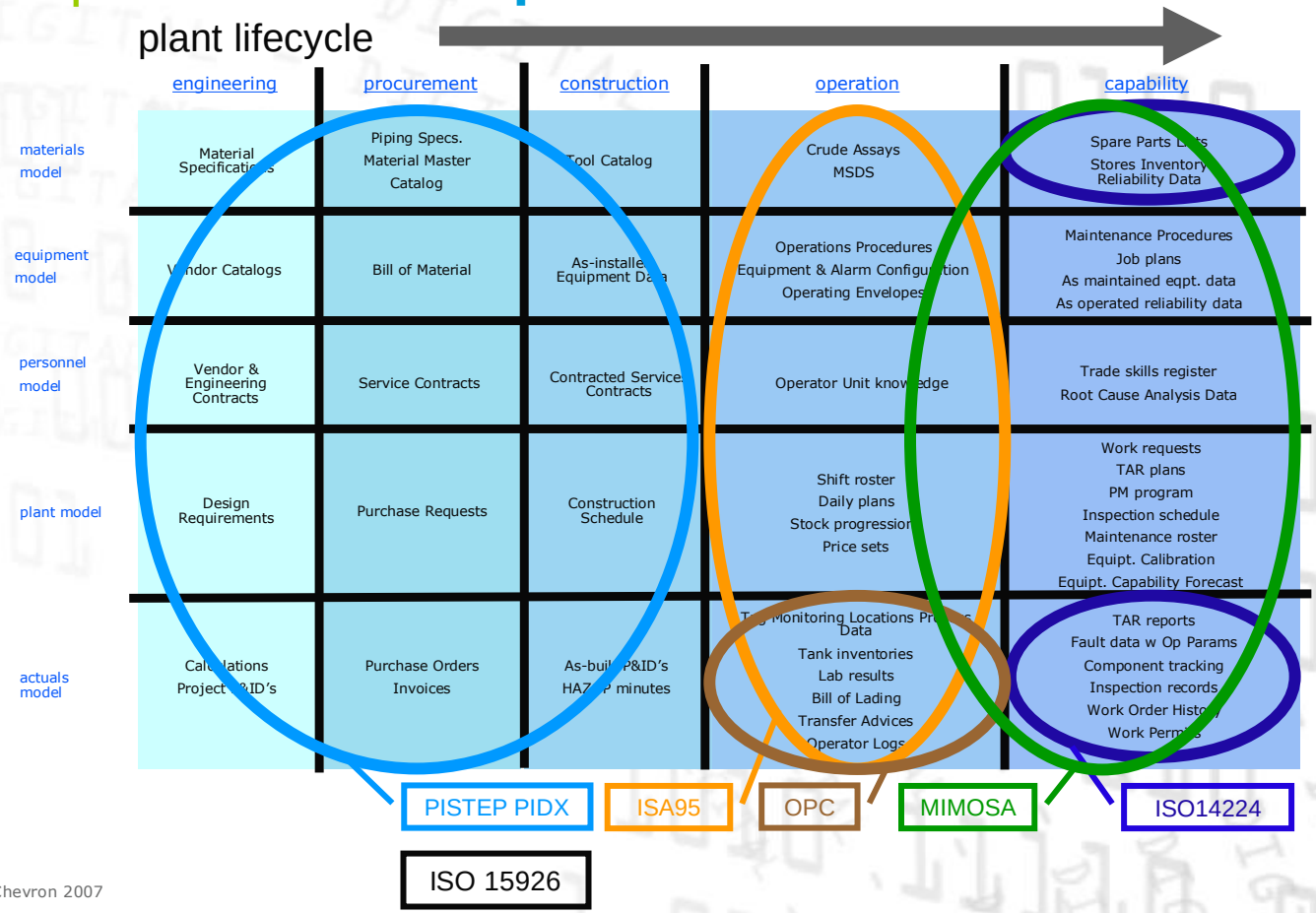
Function Legend

- **ALM** — Asset Lifecycle Mgmt & Universal ID
- **CM** — Condition Monitoring
- **ODH** — Operational Data Historian
- **HMI** — Human-Machine Interface
- **ICDM** — Instrumentation & Control Device Management
- **DSS** — Decision Support System
- **EAM** — Enterprise Asset Management / CMMS
- **MRB** — Maintenance & Reliability Browser

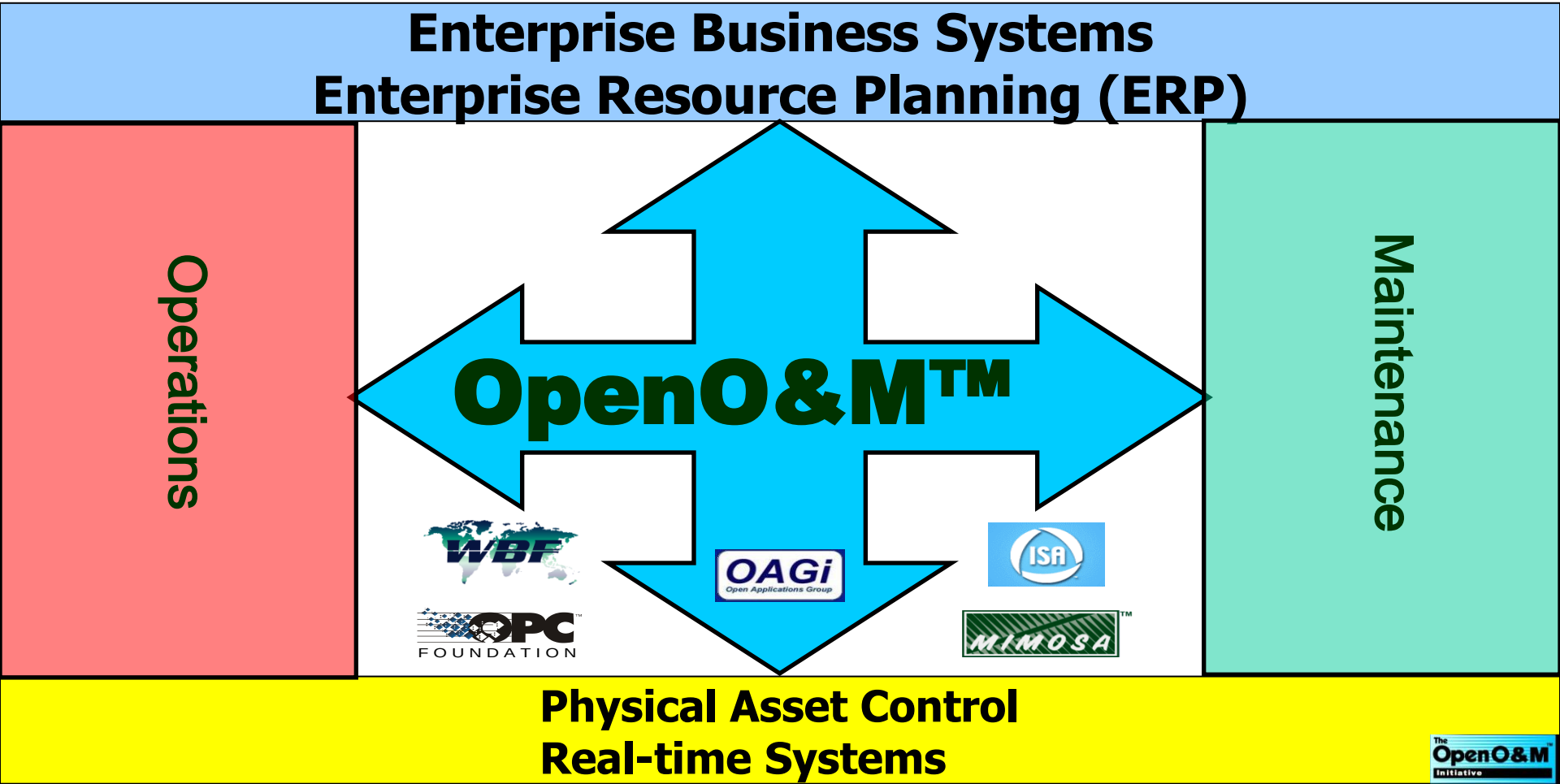
December 2004

MIMOSA™

bp data model map



The OpenO&M™ Initiative
Enabling Open Standards-based O&M Interoperability



Points of intersection

Reasons for Oil and Gas Interoperability (OGI) Pilot and ISO OGI TS (ISO 18101)

- **Problem Statement** – Current Oil and Gas and other Asset Intensive industry enterprise solutions are **too chaotic** and **too difficult** to sustain.
  - ✓ The current enterprise solutions model is critically dependent on large amounts of custom Systems Integration and this is a weak link.
    - Chaotic and Fragile – Vulnerable to breakage and exploitation
    - Expensive to sustain (20% annual recurring maintenance cost)
    - Proprietary point to point interfaces also limit flexibility and constrain innovation
  - ✓ The current solutions model often forces data to be re-entered many times rather than managing it on a full life-cycle basis and data is “trapped” in proprietary applications.
    - Decreases availability and portability of information
    - Highly **inefficient and chaotic** business process
    - Increases costs
    - Decreases quality
- **Owner/Operators are asking for a better Solutions Model**

MIMOSA™

Current Eco-system Options

Walled Garden

- Large suppliers proprietary eco-systems
- Suppliers make the rules
- Suppliers often set high barriers to entry
- High switching cost – O/O lock in
- O/O data is trapped in proprietary apps
- Innovation can be constrained

Open Source

- Can be chaotic
- Suppliers may be unknown
- Ambiguous support model
- Fragmentation often takes place
- Interoperability may become poor
- Critical infrastructure often precluded

Industrial solutions are still heavily dependent on large scale custom integration services efforts. Individual Owner/Operators redundantly bear the development and sustainment cost for each of these efforts.

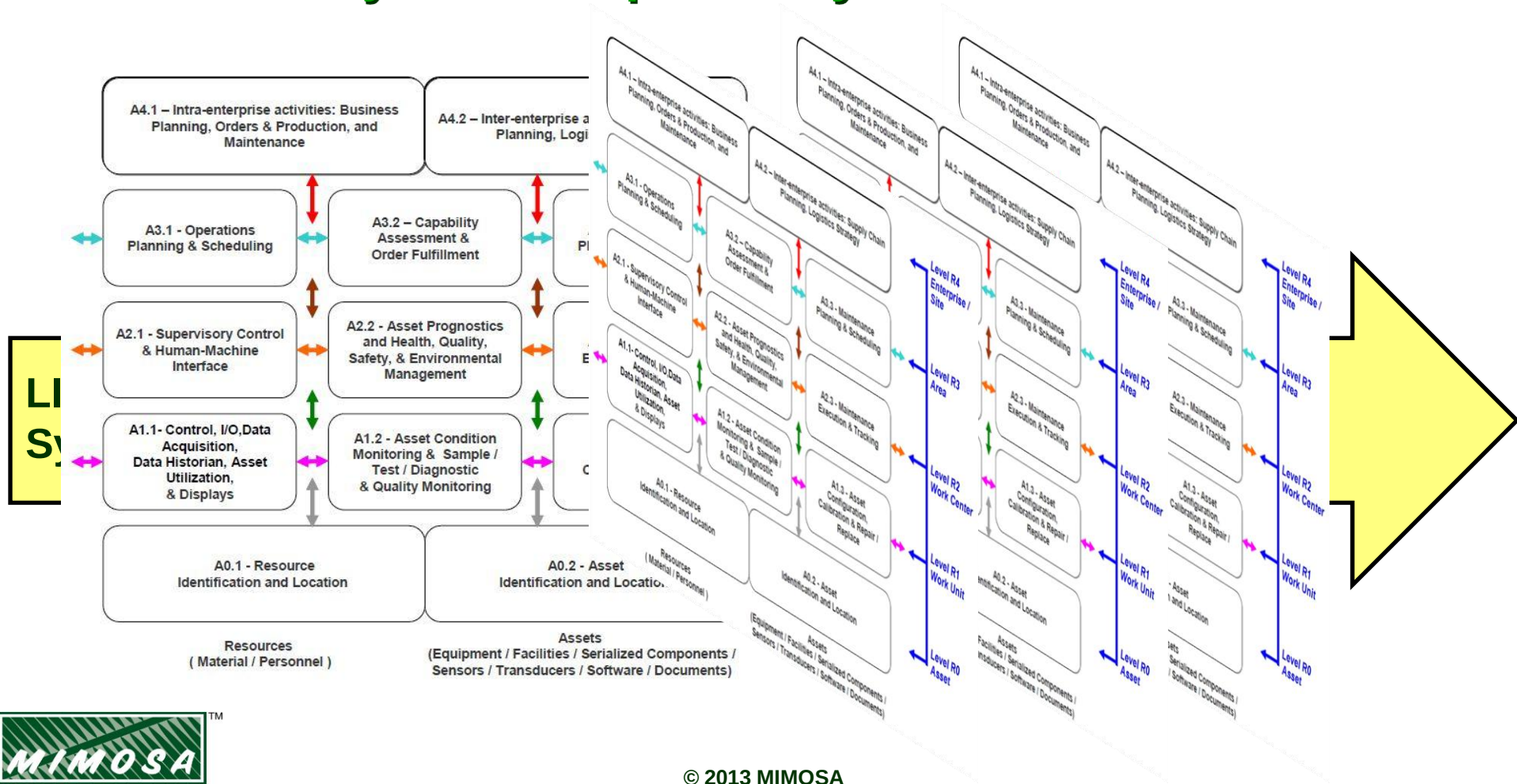
MIMOSA™

We Need a Significant Paradigm Shift
The "Un-walled Garden" and the OGI Ecosystem

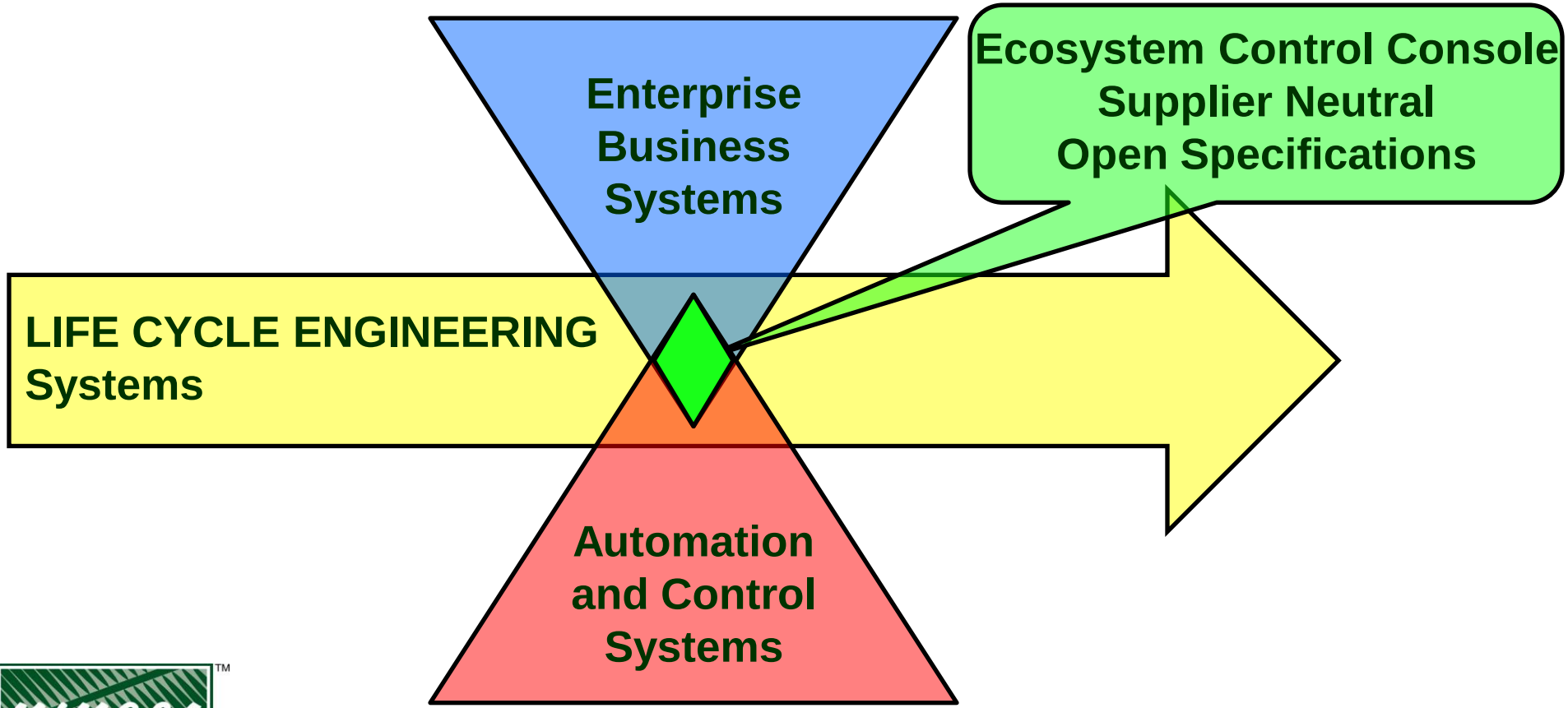
- A new industry solutions model where systems of systems interoperate in an industry eco-system defined by open, supplier neutral standards
  - ✓ Collaboration between industry standards bodies – Bring proven standards together
  - ✓ Shared, supplier neutral industry information models – O/O Data is not trapped
  - ✓ Shared, supplier neutral industry utility services , driven by industry use cases
  - ✓ All other required conventions maintained and published by industry (not individual suppliers)
- Suppliers have responsibility for developing and maintaining compatibility of their own solutions components
- Trusted public/private organization provide third-party certification & identification
- Owner/Operator Leadership and Governance
- Incremental, prioritized transformation

MIMOSA™

Life-cycle Interoperability Context for O&M



Critical Control Point for a Supplier Neutral Ecosystem Enabling Systems Interoperability



MIMOSA™

Why an Oil and Gas Industry Pilot Is Required

- The OGI Ecosystem model offers cost, quality, flexibility and risk management features distinctively superior to those achievable by individual owner/operators
- Establishing and validating a “To Be” **Industry Ecosystem and the required Industry Foundation Architecture** is not something which can be reasonably addressed by individual owner/operator project teams
- Industry Use Case-driven, solutions component specifications **can be safely taken from the industry pilot and applied to real projects**, only once they have been properly proven in an industry pilot – **Makes standards “consumable”**

➢ A properly supported OGI Pilot provides a required transformational development and validation proving grounds at minimum total cost and risk

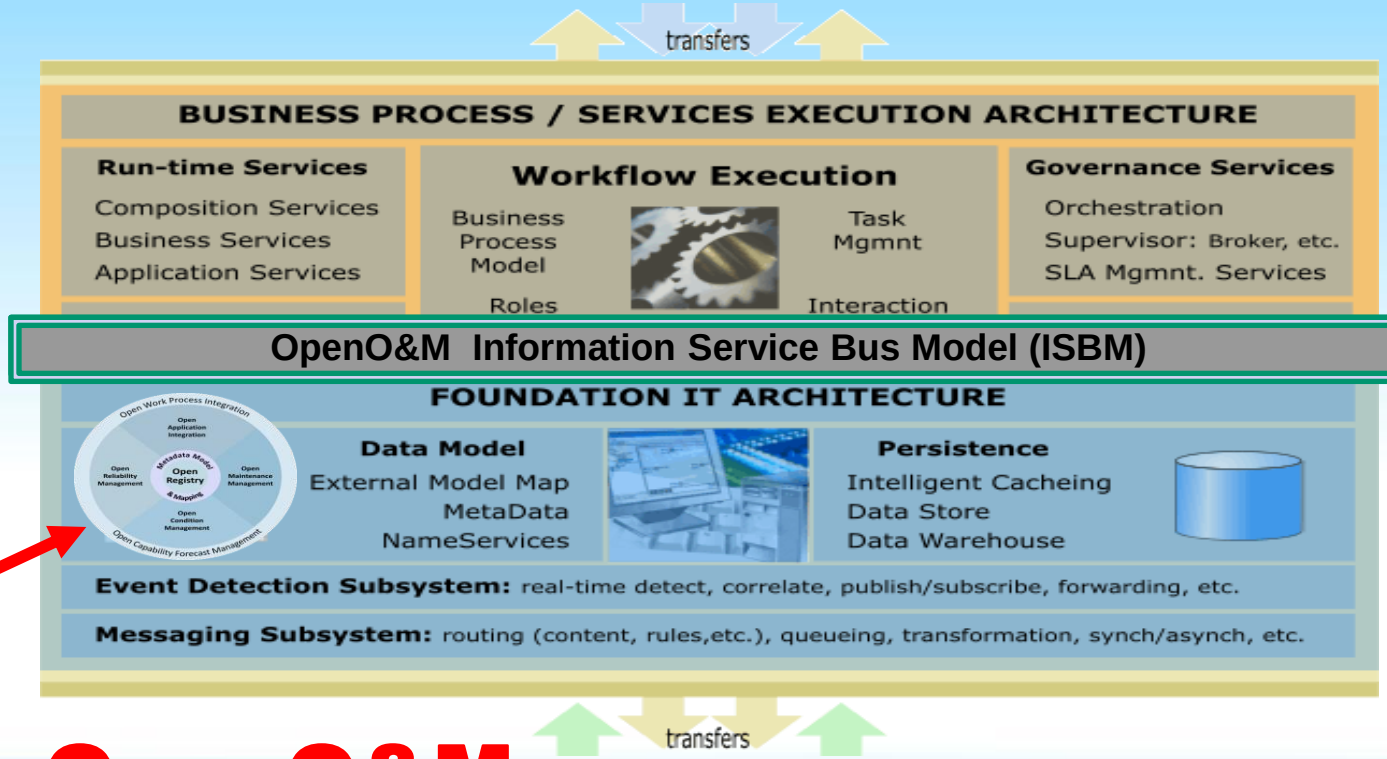
- ✓ Focused on proper asset classes and prioritized functions
- ✓ Downstream, mid-stream and upstream
- ✓ At industry scale
- ✓ Enables pragmatic, incremental transformation for owner operators

MIMOSA™

2013 MIMOSA Members Meeting-Status

- Have reached key milestones for OGI Pilot in preparation for Machine Readable, Supplier Neutral Handover from Capital Project to Operations and Maintenance
- Just published Joint MIMOSA/PCA IT Architecture Version 1.0
- Are prepared to pivot back to O&M Suppliers starting in 2014

Owner/Operators Objective
Shared Industry Foundation Architecture

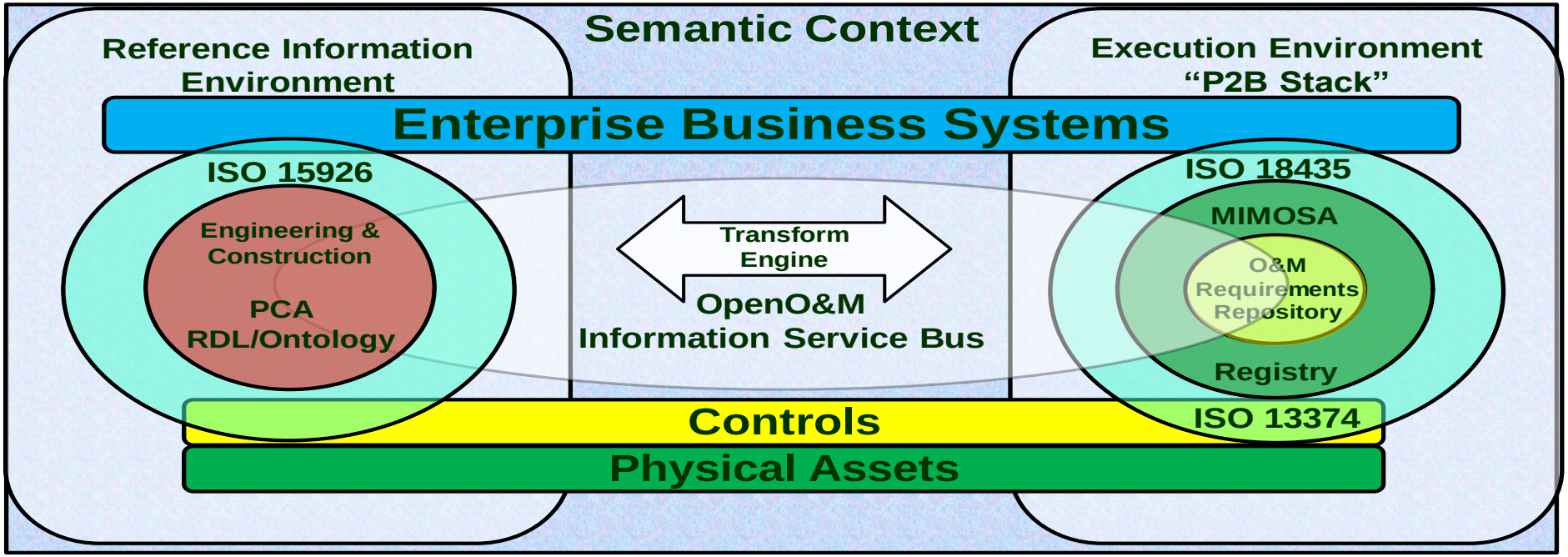


2

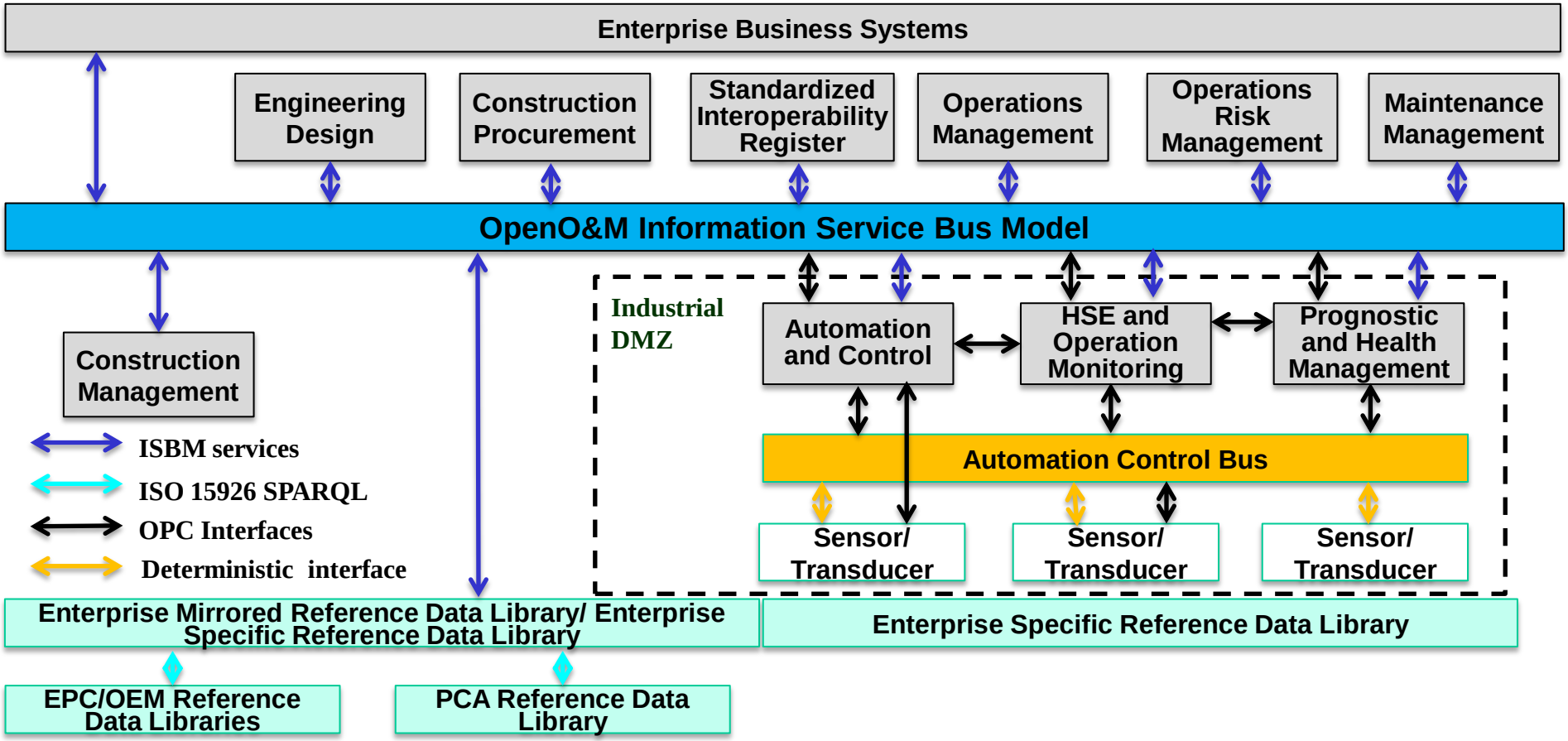
1

OpenO&M

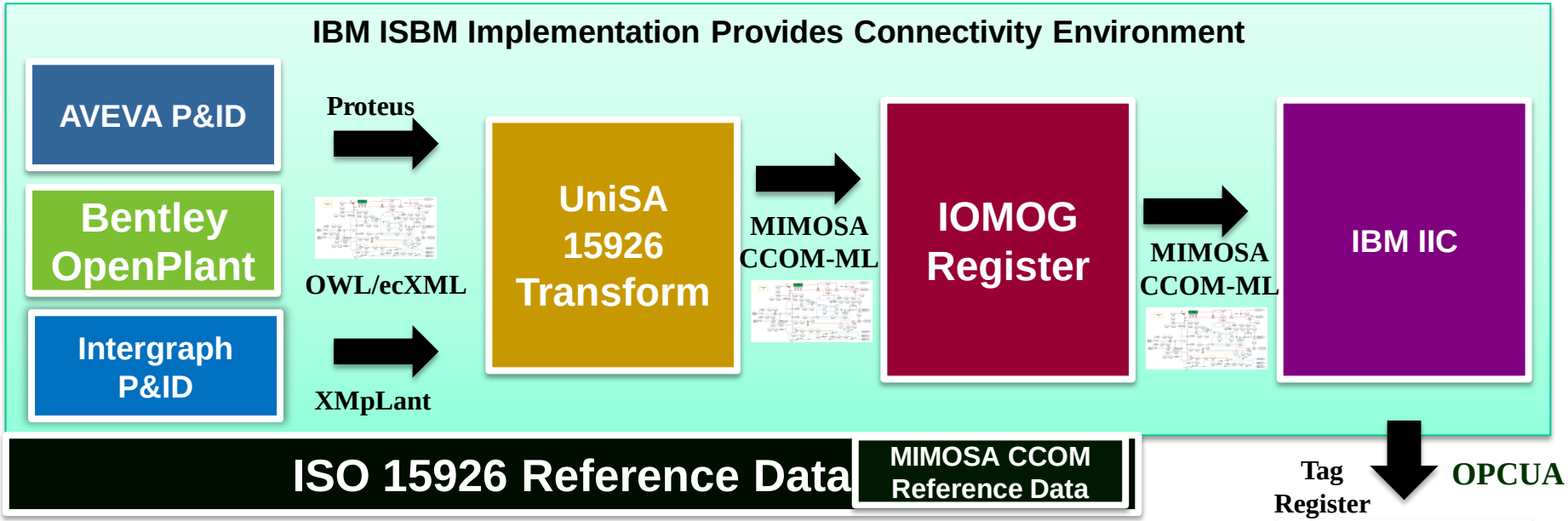
Context for Collaboration



OGI Ecosystem Simplified Systems Architecture



OGI Pilot Phase 1+ Presentation



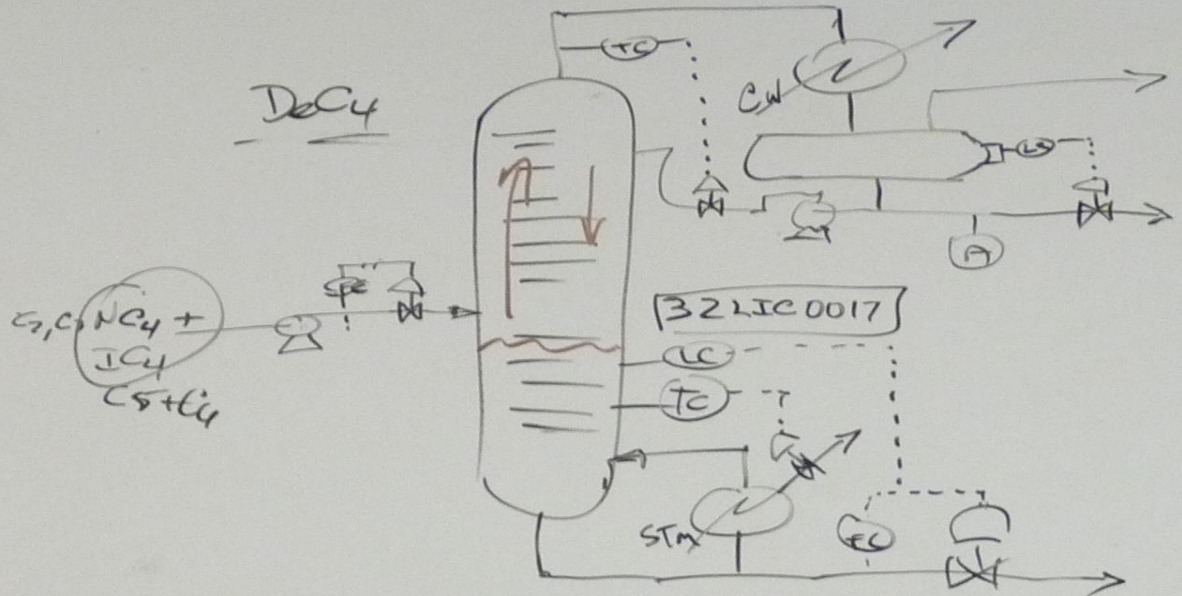
Worley Parsons-Lead EPC for Downstream OGI Pilot

- **Developing and Managing Reference Engineering Data Set**
- **Providing standard engineering artifacts used for EPC process**

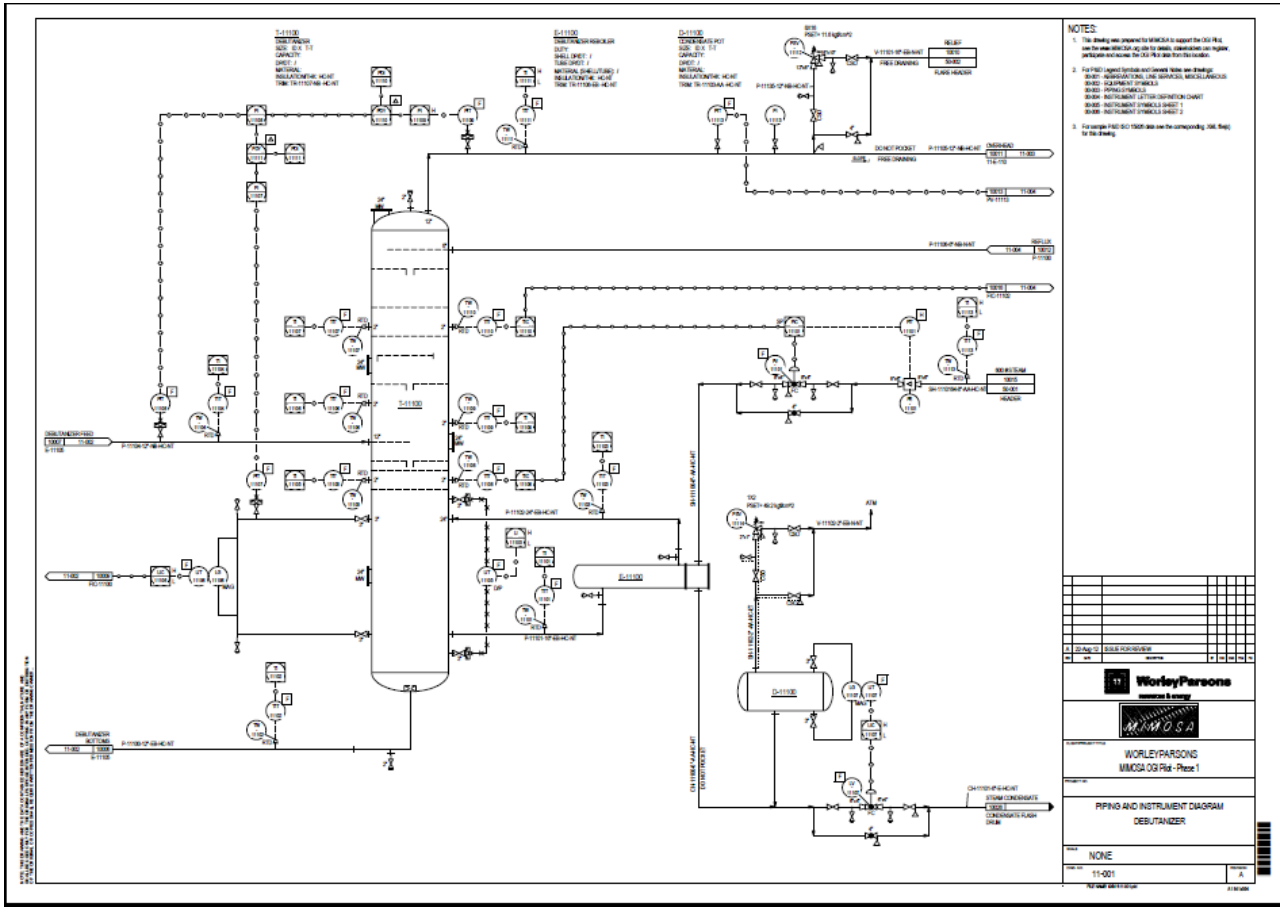
Cormac
6 Minutes

DeButanizer Fractionator

Flow Sheet (PFD)



Debutanizer P&ID 001- Worley Parsons



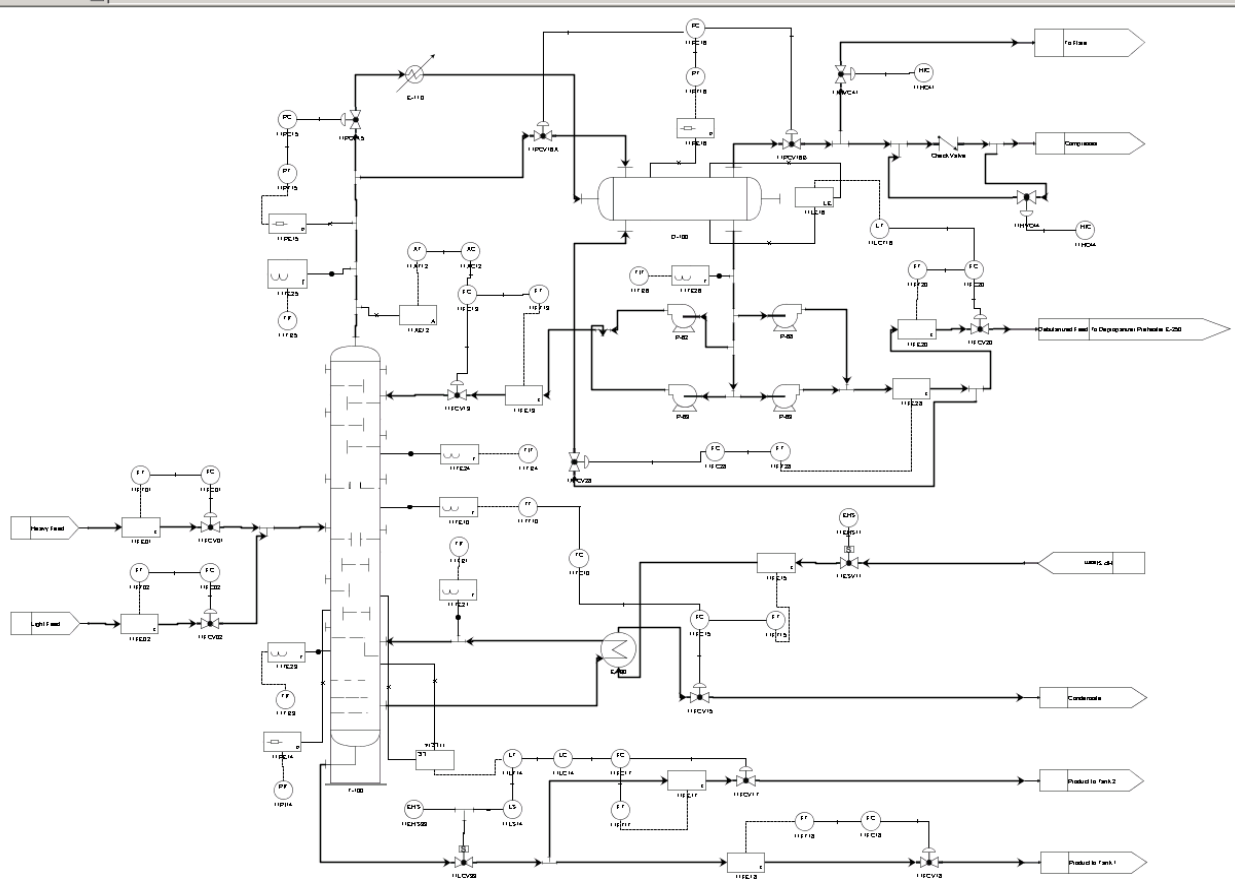
https://iicproc.indnwu.sc.ibm.com:9445 - IIC Studio Launch - Microsoft Internet Explorer

Links | Customize Links | Free Hotmail | Windows | Windows Marketplace | Windows Media

P&ID | Model | Adapter

Diagrams and Enterprises
- My Diagrams
- Published Diagrams
- Enterprises
  - NWR
    - Alberta
      - ConnectivityFolder
        - ConnectivityDi
      - Sturgeon County
        - Condenser... (
        - ConnectionTyp
        - Controller
        - Element
        - FlowMeter... (
        - HeatExchange
        - Page... (more)
        - Pumps... (mor
        - Switches and F
        - Tank... (more)
        - Tower... (more
        - Transmitters...
        - Valves... (mor

ConnectivityDiagram:NWR_Debutanizer



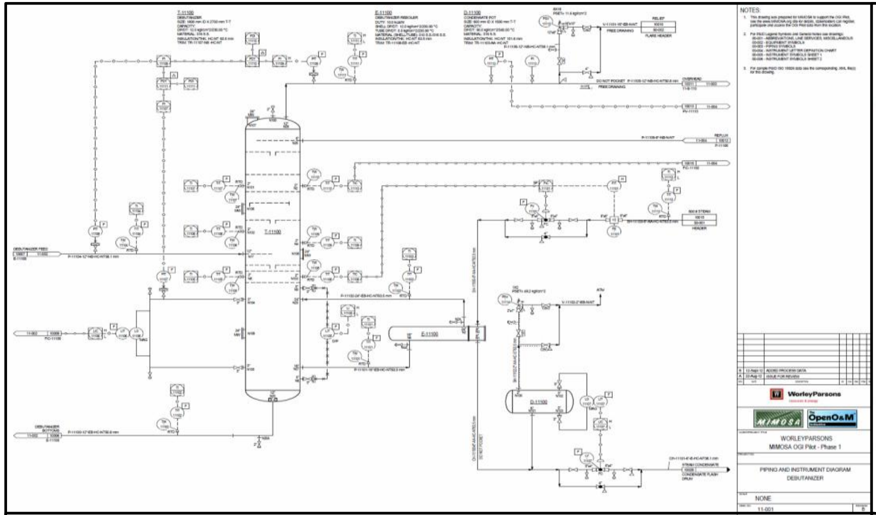
Palettes
- Base
- Connections

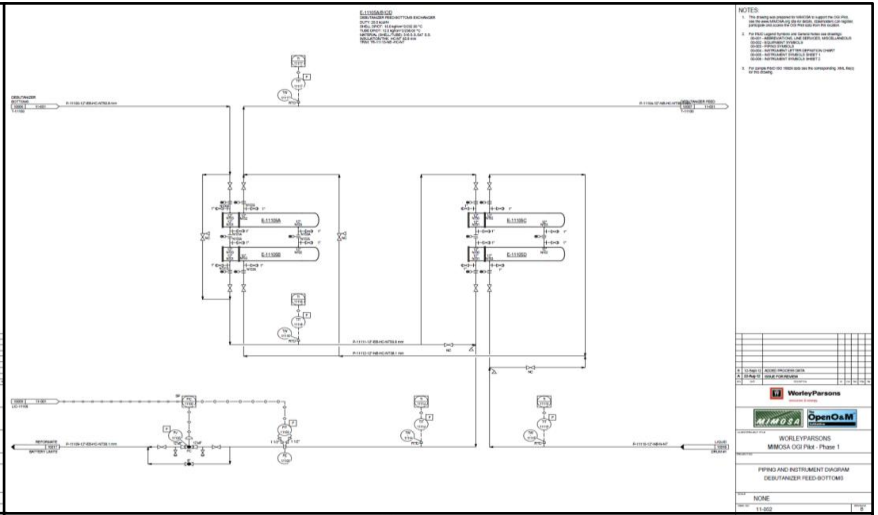
Connections
- Capillary
- Data
- Electric
- Mechanical
- Low Voltage
- Major Process
- Minor Process
- Signal
- Monitor
- Tee

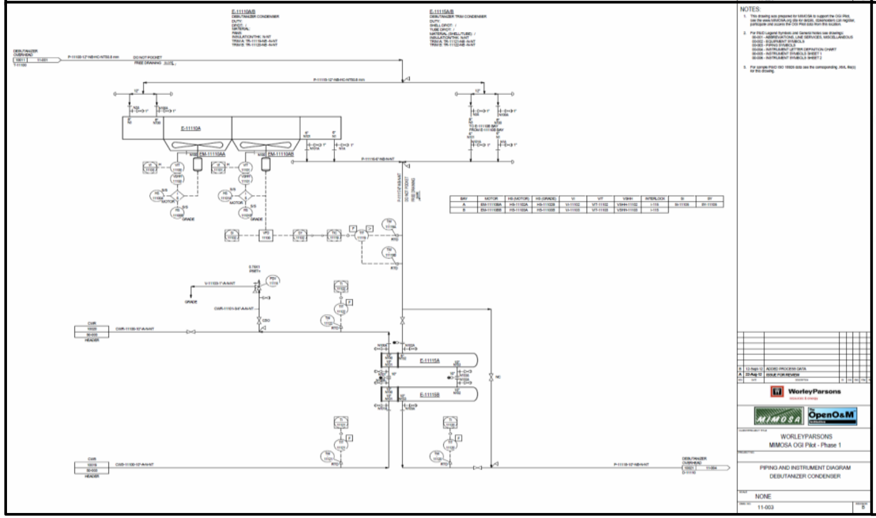
Properties | Connections | Measur...

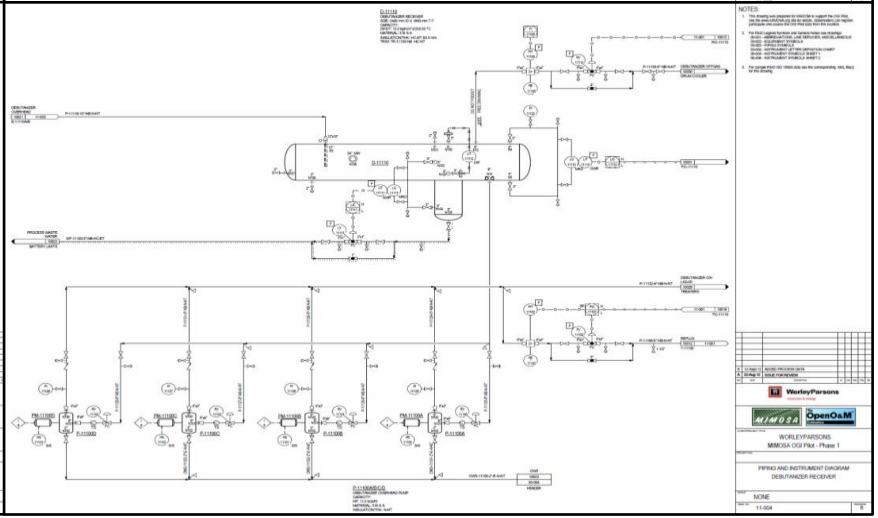
name	value
EquipmentN...	Connectivity...
ID	1313441998...
ParentID	DBB5B1B0D...
EquipType	CONNECTIV...
WidgetType	
ResourceClass	

Zooms in or out to make the diagram fit the pane.


NOTES:
WorleyParsons
MIMOSA
OpenO&M
WORLEYPARSONS
MIMOSA OGI Pilot - Phase 1
PIPING AND INSTRUMENT DIAGRAM
DEBUTANIZER
NONE
11-001


NOTES:
WorleyParsons
MIMOSA
OpenO&M
WORLEYPARSONS
MIMOSA OGI Pilot - Phase 1
PIPING AND INSTRUMENT DIAGRAM
DEBUTANIZER FEED-BOTTOMS
NONE
11-002


NOTES:
WorleyParsons
MIMOSA
OpenO&M
WORLEYPARSONS
MIMOSA OGI Pilot - Phase 1
PIPING AND INSTRUMENT DIAGRAM
DEBUTANIZER CONDENSER
NONE
11-003


NOTES:
WorleyParsons
MIMOSA
OpenO&M
WORLEYPARSONS
MIMOSA OGI Pilot - Phase 1
PIPING AND INSTRUMENT DIAGRAM
DEBUTANIZER RECEIVER
NONE
11-004

Oil and Gas Interoperability (OGI) Pilot - Summary

- **Owner/Operator leadership**
- Industry Use Case driven - (OpenO&M, PCA and SPE DSA-TS) Use Cases
- Cooperatively aligned with PCA under Joint MIMOSA/PCA O&M SIG
- **Managed like a true capital project-** Worley Parsons-Lead EPC for downstream
- Pragmatic focus on Commercial Off The Shelf (COTS) products
- Suppliers assume responsibility for compliance of their own products

➢ **Current Status**-Planning Phase 2 inclusions based on closing gaps identified in Phase 1, adding existing O&M use cases and **adding upstream specific elements**

➢ Publication – Working documents and results are on the mimosa website at www.mimosa.org

➢ **Proven OGI Pilot output provides basis for ISO 18101 Technical Specification**

➢ **Industry press coverage for OGI Pilot**

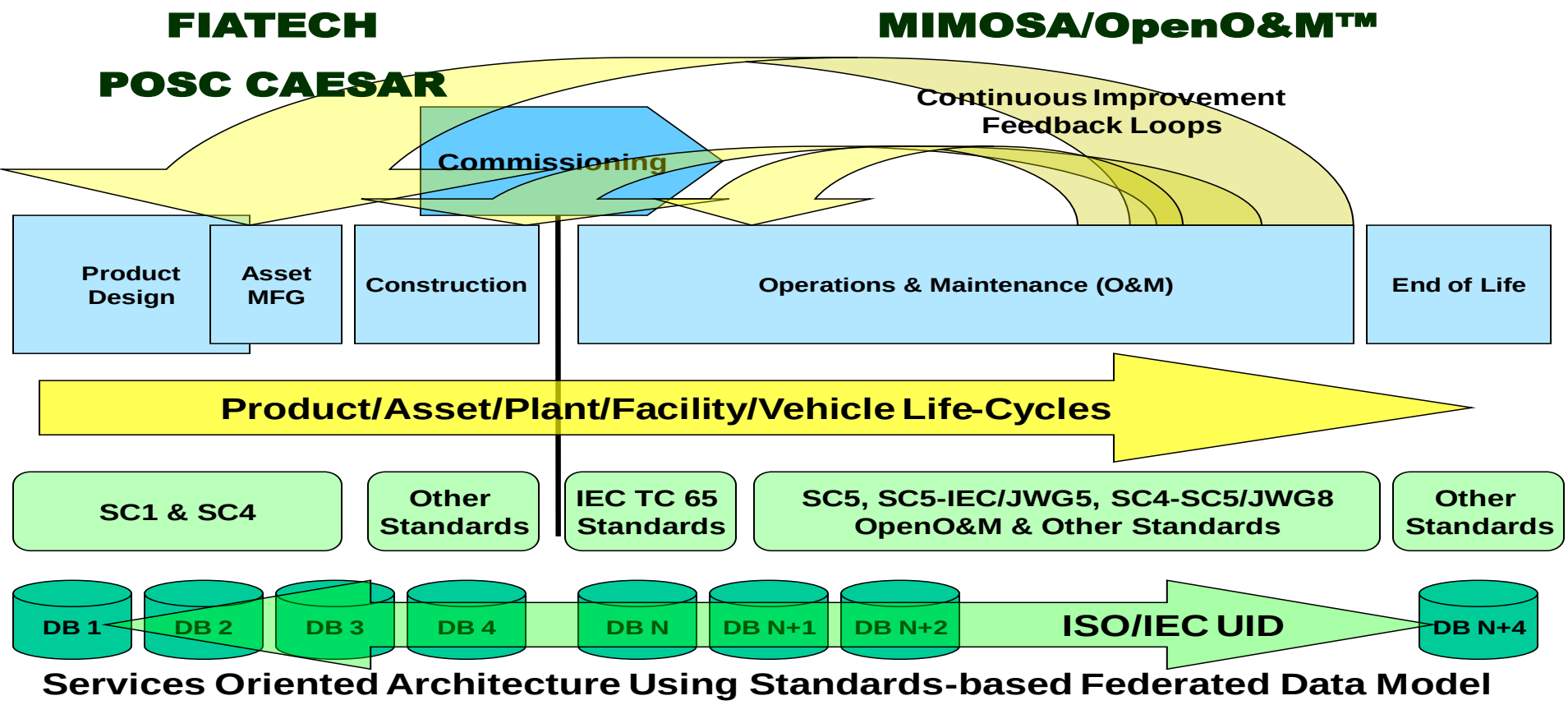
- ➢ **iRING Today**
- ➢ www.PhysicalAssetLifecycle.com

LEVERAGING THE ISO PROCESS FOR ESTABLISHING STANDARDS AND SPECIFICATIONS

- The ISO Manufacturing asset management Integration Task Force
- ISO OGI Technical Specification (ISO 18101)

ISO TC184 Manufacturing Asset Management Integration Task Force
Total Asset Life-Cycle Summary

March 2009



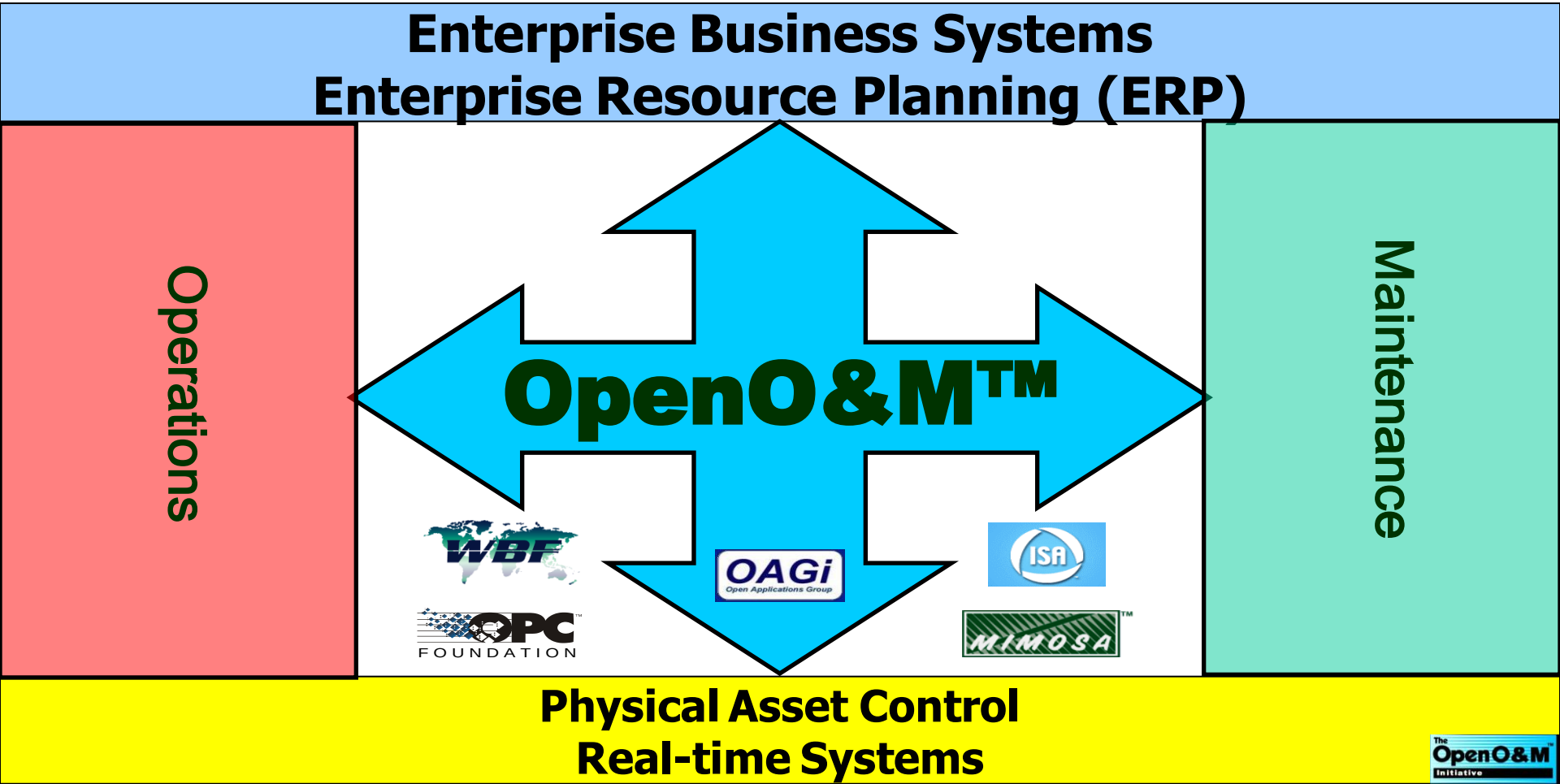
ISO TC 184/WG 6

Oil and Gas asset management operations and maintenance Interoperability (OGI) Technical Specification Project Update

Alan T. Johnston
Convener
Nils Sandsmark
Co-convener

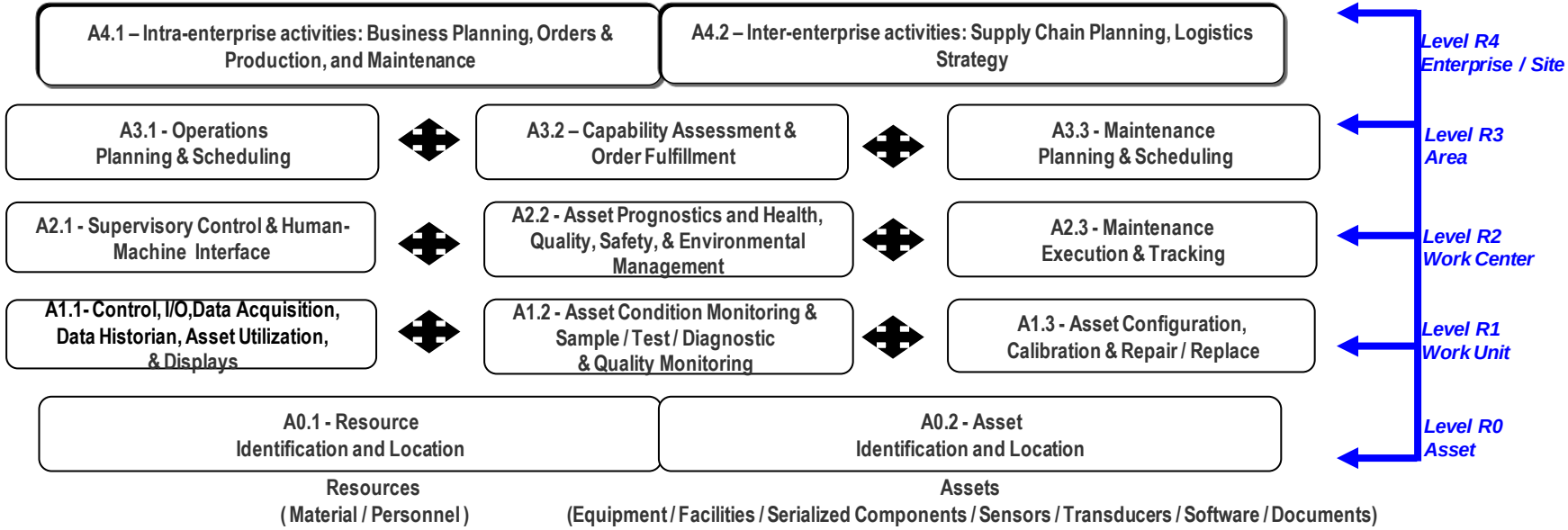
September 23- 25, 2012
Orlando, FL

The OpenO&M™ Initiative
Enabling Open Standards-based O&M Interoperability



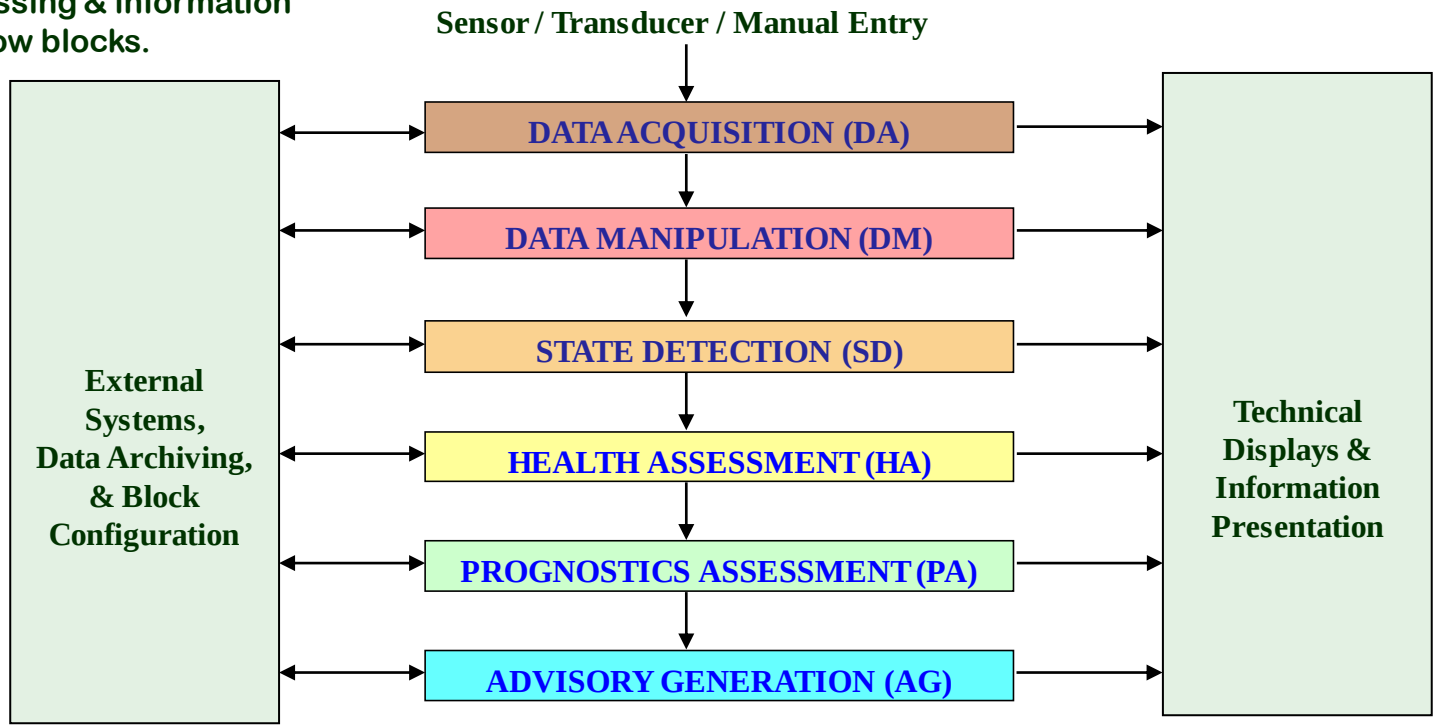
ISO 18435 - 1
Application Domain Integration Diagram

Application Domain Integration Diagram



ISO 13374 Standard

Machine condition assessment data processing & information flow blocks.



Some Relevant ISO Related Activities

ISO TC 67
Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries

ISO 14224

Petroleum, petrochemical and natural gas industries -- Collection and exchange of reliability and maintenance data for equipment

ISO TC 108
Mechanical vibration and shock

SC5
Condition monitoring and diagnostics of machines

ISO 13374

MIMOSA OSA-CBM

WG6

Formats and methods for communicating, presenting and displaying relevant information and data

ISO TC 184
Industrial automation systems and integration

SC4
Industrial Data

15926- Data for Process Industries

10303-Product data representation and exchange

STEP/PLCS

OASIS

Collaborating on the deployment of an international standard for product data exchange (ISO 10303)

SC5
Architecture, communications and integration frameworks

ISO 18435

MIMOSA OSA-EAI

WG7

Diagnostic and maintenance applications integration

Scope and Deliverables

- **The OGI TS** specifies the use of a combination of ISO and industry standards to meet the interoperability requirements of the Oil and Gas industry and appropriate closely related industry groups such as the Petrochemical industry.
- Major associated deliverables include:
  - ✓ Industry developed and owned **Pilots** driven by industry Use Cases
    - Downstream Pilot
    - Upstream Production Optimization and Drilling Automation Pilots
  - ✓ Industry developed and owned **Use Cases** are prioritized by owner/operators and **incorporated by reference**
  - ✓ Industry developed and owned pilot & **Compliance Data Sets** are **incorporated by reference**
    - Downstream Data Set – Plant Light Ends Unit with debutanizer and depropanizer towers
    - Upstream – Drilling Automation , Rigs and Wells Construction Data Sets – with SPE DSATS