DSA Roadmap

DSA Decision Making and Control Framework

Program Manager: John de Wardt, DE WARDT AND CO

john@dewardt.com

Website: www.dsaroadmap.org

Photo Permitted

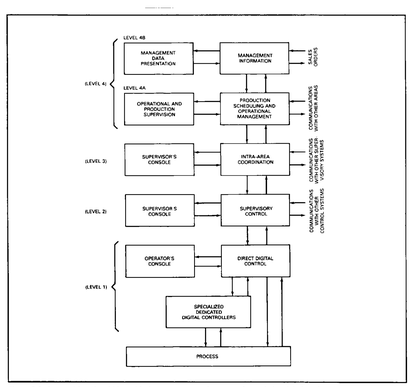


Figure 3-1 Assumed functional hierarchical computer control structure for an industrial plant (continuous process such as petrochemical).

Purdue Model

A Computer Integrated Manufacturing (CIM) model created in 1989 at the International Purdue Workshop on Industrial Computer Systems.

It was developed to improve the probability that a truly integrated information system could be rapidly achieved.

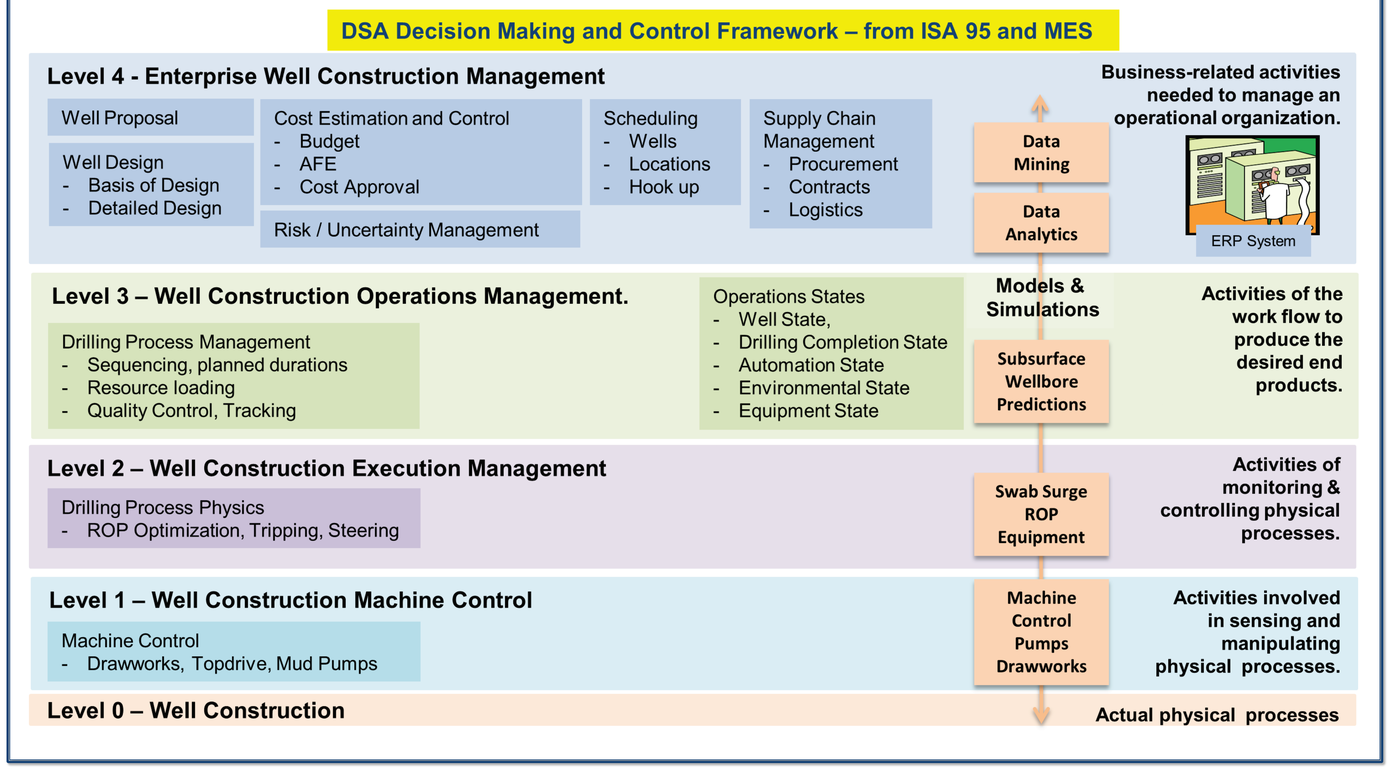
This model provides a construct of the relationships connected to shop floor activities.

Original Purdue - 1989

Purpose of the DSA Decision and Control making Framework

This framework provides a map for the relationship of various interrelated systems in the application of DSA.
The five levels for well construction identified on the left-hand side of the graphic and listed below correspond to the five layers defined in the Purdue / ISA-95 reference model:

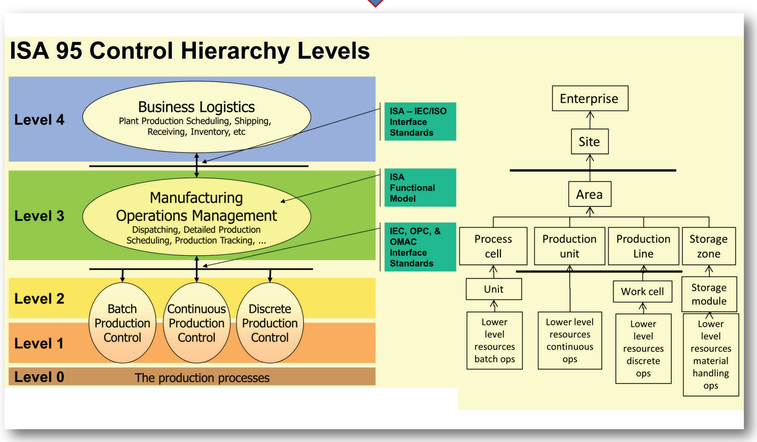
- **Level 4 - Enterprise management**. Managing business-related activities of the drilling operation (business planning and logistics).
- **Level 3 - Operations management**. Managing workflows to drill, protect the hole, and complete the well.
- **Level 2 - Execution management**. Supervising, monitoring, and controlling the physical processes with real-time controls and software.
- **Level 1 - Machine control**. Sensing and manipulating the physical processes.
- **Level 0 - Physical processes**. Defining actual physical processes of the drilling and completion operation (Well construction).



List value from DSA framework

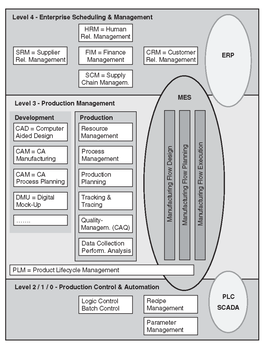
List issues that need review in the framework

List items that need to be expanded in their description in the framework



International Automation Society – ISA 95

Enterprise-control system integration



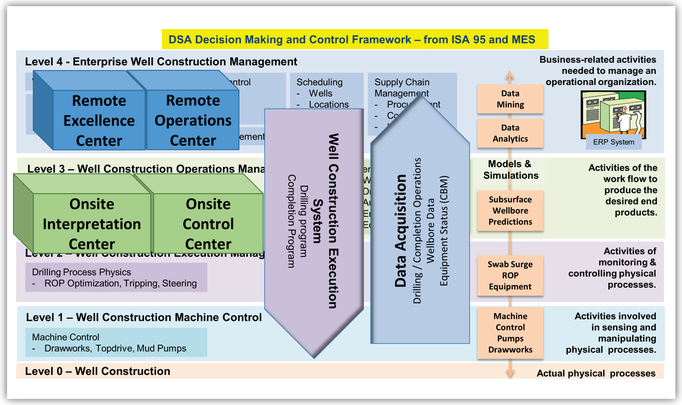
MES Impact

This diagram demonstrates the interaction of the Manufacturing Execution Systems with the levels of control in ISA 95.

The planning, design and execution work flows through the levels within the hierarchy provide a basis for development of similar workflows for drilling planning and operations

Manufacturing Execution System

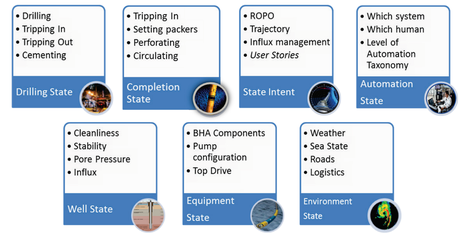
Overview of terms with regard to ISA 95 levels



Systems and Centers

This version highlights the work flows in the Well Construction Execution System and Data Acquisition. It also locates the onsite and remote centers relative to the hierarchy.

The distinction between control / operations and interpretation / excellence centers is that the former performs in the supervisory control loop and the latter analyses data to feed new parameters to the former.



States Definition for Automation

This “state machine” concept of the drilling process is fundamental to drilling systems automation, and all tasks, models and activities during drilling correlate with the current state of the drilling process. Consequently, it is critical that the current state be well known and communicated to all users, and that the transition to a new state be broadcast simultaneously to all users in real time.

Epics, User Stories and Use Cases

The combination of epics (drill a stand), user stories (fast, safe connection), and use cases (discrete activities) provides the framework to identify systematic needs from the automation system providing the industry with a framework to track and control what is happening during any automated activity, including sharing a common understanding of the intent of the controlling automation system at any time.