Setting the Standard for Automation™

ISA-106
Procedure Automation for Continuous Process Operations

ARC Industry Forum 2014

Minimizing Operational Risk through Procedural Automation

Standards
Certification
Education & Training
Publishing
Conferences & Exhibits

ISA106 Standards Committee

- Procedure Automation for Continuous Process Operations
- Membership
  - 168 members from 106 companies
  - 25 voting members
  - ~45% of members are from owner / operators
- Co-Chairmen
  - Yahya Nazer, Dow Chemical
  - Bill Wray, Bayer Material Sciences

Owner/Operator Participants (Partial)

- AREVA
- Bayer Material Science
- BP Lubricants
- Braskem
- Chevron
- DSM Corporate Operations
- DuPont
- ExxonMobil
- Phillips 66
- Saudi Aramco
- Savannah River Nuclear Solutions
- Shell
- The Dow Chemical Company
- Valero Energy Corp

Why Not Just Use ISA-88?

- ISA-88 Batch Control Standard
  - Released in 1995
  - Adopted globally in the batch industry
  - Rarely used in the continuous process industries

- Continuous process operations have different characteristics than batch operations

- No significant adoption - Time for something different

- Goal: Make procedure automation an expected part of any capital project

Typical Targets for Automated Procedures

- Refining
  - Transition Management - Crude Switchover
  - Regeneration
- Petrochemical
  - Startup / Shutdown
  - Transition Management – Grade Changes
  - Line Switchover
  - Cleaning
- Polymers
  - Grade change
  - Switchover
- Furnaces
  - Decoking

Benefits of Using Procedure Automation

- Improved safety performance
- Improved reliability
- Reduced losses from human error
- Increased production by improving startups and shutdowns
- Increased production and quality via efficient transitions
- Reduced losses through improved responses to disturbances.
- Improved operator effectiveness
- Higher retention and improved dissemination of knowledge
- Improved training
- Improved insight into the process
- More efficient change control
- Reduced costs of enterprise adaptation
- Common definitions and terminology

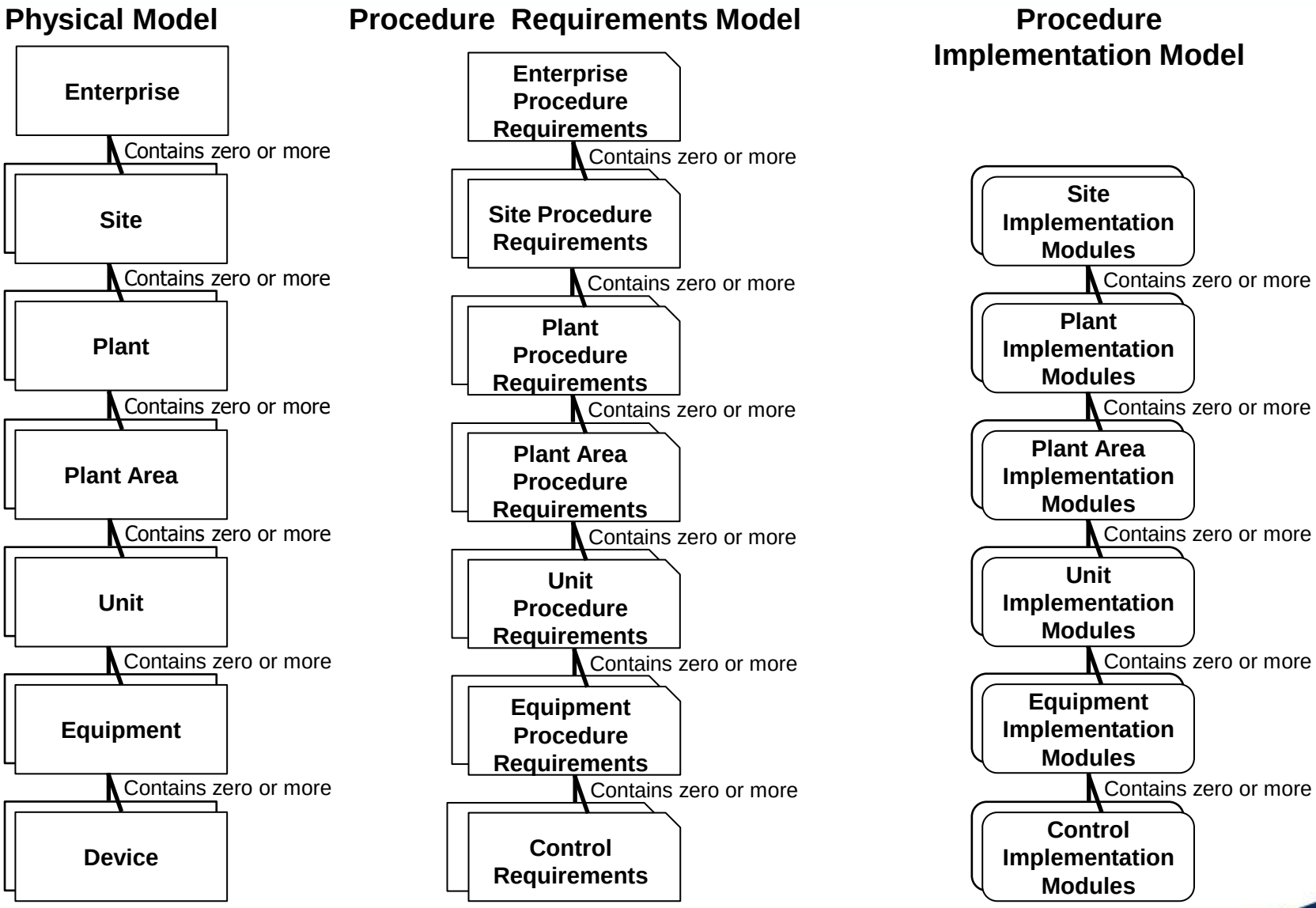
ISA106 Work Items

- Published 1st Technical Report in 2013
  - Models and Terminology
- Working on the 2nd Technical Report
  - Work Processes
- Work on the Standard is expected to start in 2014
  - Use industry feedback on the technical reports to create the standard

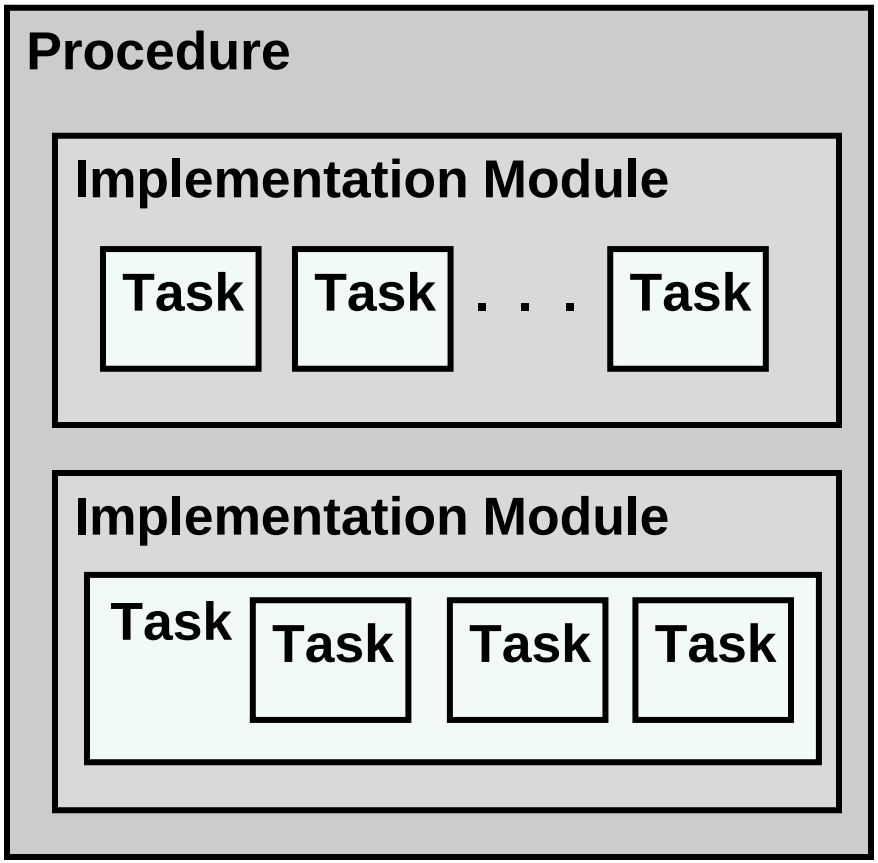
Technical Report 1:
Models and Terminology

- 1st Technical Report
  - States committee's current thinking on how to organize and approach procedure automation
- Models
  - Concepts to give the industry a common mental model for automated procedures
- Terminology
  - Definitions to give the industry a common language for automated procedures

ISA-106 Key Models



Procedure Execution



- Each Procedure, Implementation Module & Task has 3 execution work items
  - **Command** – Trigger
  - **Perform** – Actions
  - **Verify** – Success/Failure
- Computer/Human Mix
  - C-P-V work items can be done by a computer or human

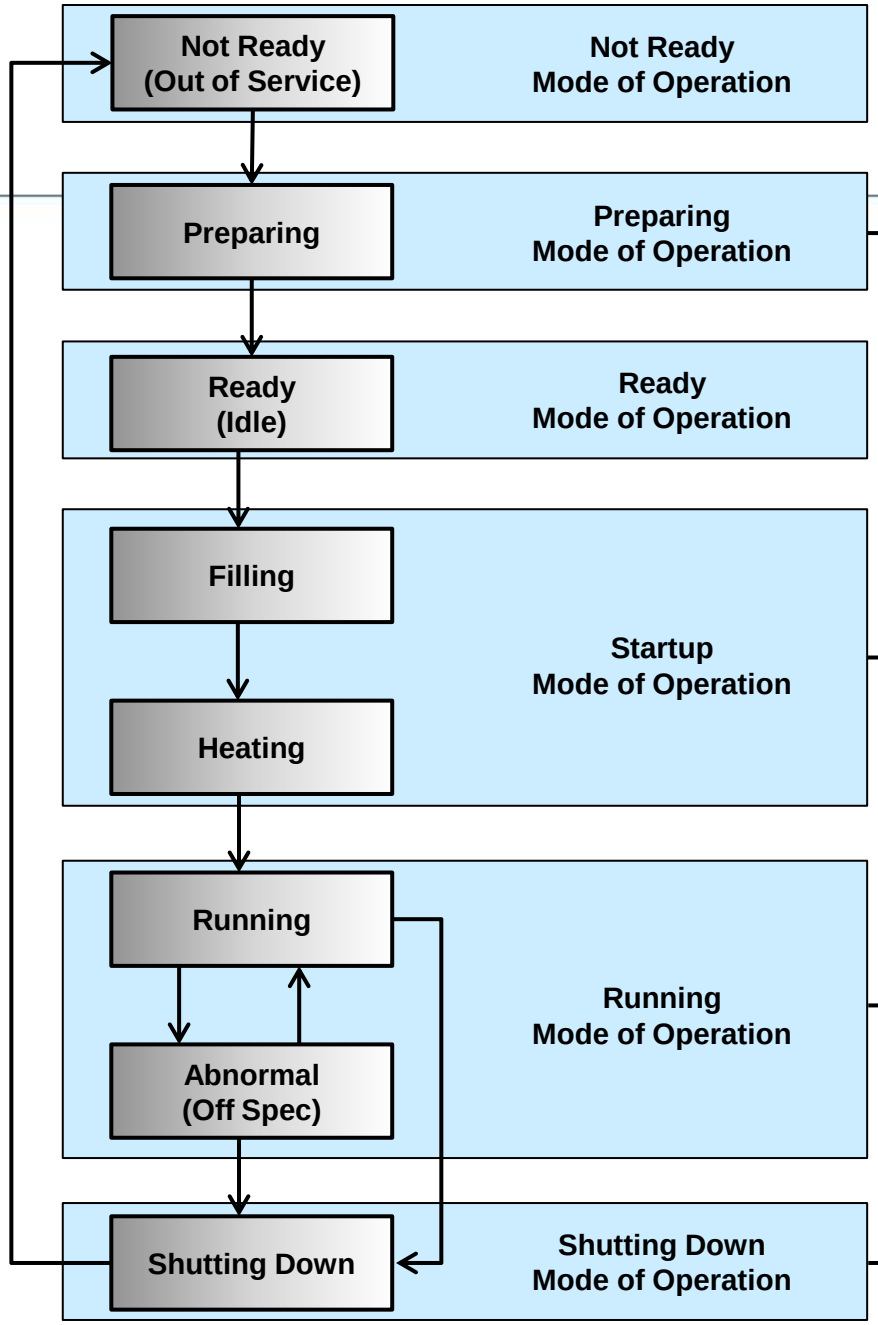
Command ›››› Perform ›››› Verify

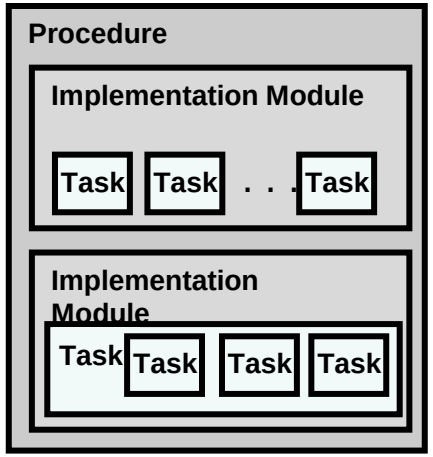
Automation Styles

- Organization of the structure of the implementation module such as using procedure sections or process states
- Use of computer or operator action for command, perform, verify
- Amount of precision used for verification
- Human machine interface philosophy
- Degree of automation from minimal automation to complex automation

Example Automation Style	Example Description
Manual	The Operator is responsible for the command, perform and verify work items, minimal automation is used
Computer Assisted	Operator and computer share responsibility for the command, perform and verify work items. The amount of automation used may vary.
Fully Automated	Computer is responsible for the bulk of the command, perform and verify work items.

State-based Control Example





Take Away

- Procedure Automation for Continuous Process Operations
  - Technical Report 1 – Models and Terminology
  - Technical Report 2 – Work Processes – Under Development
  - Standard – Start writing in 2014

- Participate in writing the standard
  - www.isa.org