

Affiliations



Program Manager: John de Wardt, DE WARDT AND CO

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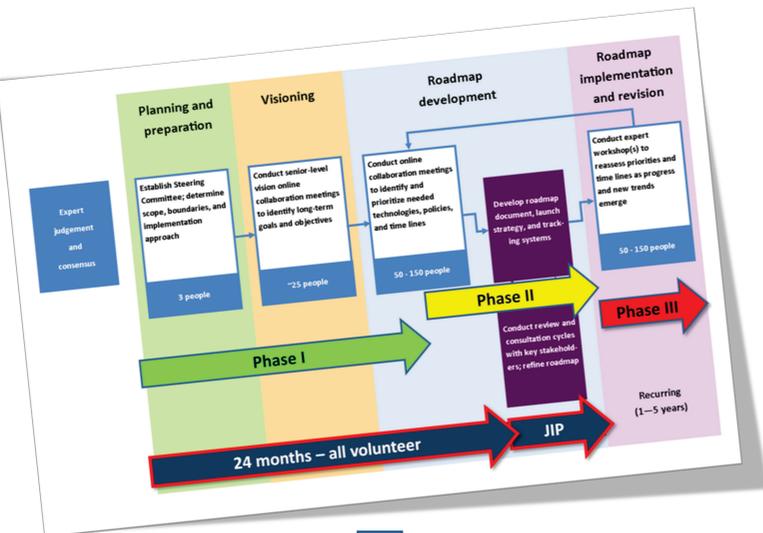
Website: www.dsaroadmap.org



Photo Permitted

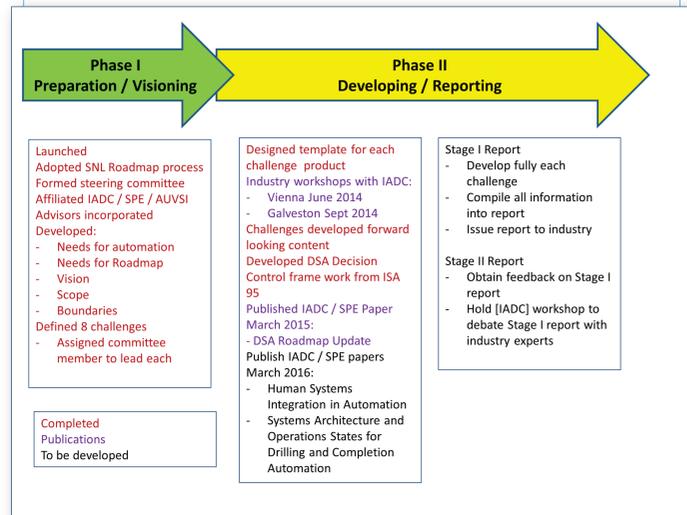
The Program

Purpose: develop an industry roadmap for common understanding of how drilling systems automation will develop
Phase I: volunteers established process (based on Sandi National Labs program), expectations, scope and foundation for Phase II
Phase II: funded joint industry project (JIP) to develop industry report



Status

- ✓ Initiative set the foundation so industry can work together for a common solution on which to apply proprietary techniques.
- ✓ Requires funding to deliver business value from the future work listed below.



Continuing the Work

- ❖ Challenge teams directed by committee members developing their forward views – around 50 industry individuals involved
- ❖ Updates of progress published in one overall and two challenge specific SPE / IADC papers
- ❖ Pace of progress requires dedicated leadership resource – need for a Joint Industry Project funded by sponsors

The Team

Program Manager: John de Wardt, DE WARDT AND CO
 Deputy Program Manager: Ed Tovar, InTechSys

Steering Committee:

- Mark Andersen, Shell
- Eric Cayeux, IRIS
- Amanda DiFiore, AMD Consulting
- Blaine Dow, M-I Swaco
- Clay Flannigan, SWRI
- Slim Hbaieb, Schlumberger
- Calvin Inabinett, Independent
- Moray Laing, SAS / SPE DSATS
- Terry Loftis, Transocean / IADC ART
- Robin Macmillan, NOV / IADC ART / SPE DSATS
- John Macpherson, Baker Hughes / SPE DSATS
- Bob Moran, Halliburton
- Randy Mutch, Ensign
- Lindsay Voss, AUVSI
- Mario Zamora, Retired – M-I Swaco

Expert Advisors:

- John Berra, Formerly Emerson
- Eric Nettleton, Formerly Rio Tinto
- Tom Sheridan, MIT Professor Emeritus

Phase II Stage I Report Content

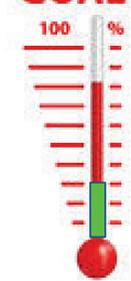
- Executive Summary
- Purpose, scope and boundaries
- Needs for automation and roadmap
- Vision, product definition - onshore multiple wells & offshore exploration
- Current State / Future State 2025
- Description of 9 challenges
- Graphical map
- Value proposition - integrated development of Drilling Systems Automation

JIP Funding - 2016
 6 months to Phase II / Stage I report

Lead Sponsors: ExxonMobil, Shell, NOV

Target is 10 sponsors at \$10,000
Seeking 7 more sponsors

GOAL



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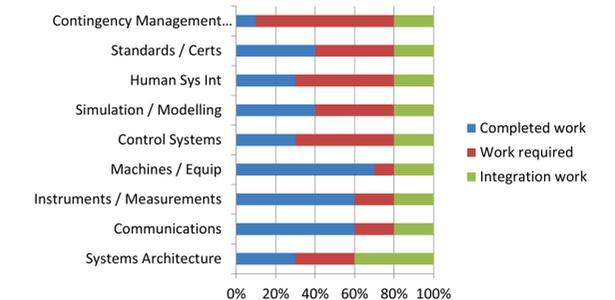
List names / contact for potential JIP sponsors

The 9 Key Challenges

Coordinated teams of industry experts commenced mapping these parallel interdependent tracts forming the foundation for the JIP

- Systems Architecture:** physical interoperability of drilling systems, workflow hierarchy, state definition, system functionality
- Communications:** addresses links among the downhole, surface, remote operating centers, and distributed experts, in addition to standards for common protocols and interoperability, deterministic systems for hardware control, and secure data transport at all levels
- Sensors / Instrumentation and Measurements:** requirements for timely, comprehensive, reliable, quality measurements downhole and surface operations
- Drilling Machines and Equipment:** surface and downhole drilling equipment, robotics, highly mechanized and semi-autonomous
- Control Systems:** downhole, surface, and remote monitoring through advisory control to autonomous systems
- Simulation Systems and Modeling:** planning, real-time, offline, remote and post-well
- Human Systems Integration:** interaction of automation systems with humans including displays, human machine interfaces, role competencies, training, adaptive control
- Industry Standards and Certification:** available and required standards and regulations
- Contingency Management System:** critical for safe, deterministic, trustable, deployable autonomy – system ability to “get out of trouble” (added Dec 2015)

Workload from current state to Stage I report state



Integration work is the linkage between the 9 challenges to form a matched timeline for 10 years development

List issues roadmap should address



Publications

SPE / IADC-173010-MS
Drilling Systems Automation Roadmap – The Means to Accelerate Adoption
 Drilling Conference, London, March 2015

IADC / SPE-178814-MS
Systems Architecture and Operations States for Drilling and Completion: The Foundation to Real Performance Measurement and Drilling Systems Automation
 Drilling Conference, Ft. Worth, March 2016

IADC / SPE-178841-MS
Human Systems Integration: Key Enabler for Improved Driller Performance and Successful Automation Application
 Drilling Conference, Ft. Worth, March 2016

Available at: www.onepetro.org

List needs for a roadmap