Drilling Systems Automation Roadmap

A cross industry initiative whose time has come

Co-Founders / Co-Chairmen:
Daniel Declute-Melançon, Halliburton
John de Wardt, DE WARDT AND COMPANY
Ed Tovar, InTechSys
The road so far ....

• Why it started
• How it started
• The process
• Goals
• Status so far
• Climb on board
SPE ATW Vail 2012 – Next Big Jump

• Need for a Drilling Systems Automation Vision
• Need for an industry strategy
• Need to coordinate across industries
• Develop a catalyst for standardization

• A roadmap is best means to achieve
Why now?

Tipping point

Zero non-conformance
Failure to act can cost dearly

- Automation in industry since 1990’s
- Process safety / Personal safety
- Efficiency (consistency) = costs and speed
- Quality = well productivity
- Autonomy (no human in the loop) being implemented in advanced systems
Failure to act can cost dearly

• Automation in industry since 1990’s
  • Process safety (reliability) = costs and speed
  • Efficiency (consistency) = well productivity
  • Autonomy (no human in the loop) being implemented in advanced systems
Types of Innovation

1. Continuous Improvement – short timeline
   1. Negligible changes
   2. Low risk / min technology development

2. Incremental Innovation – medium term
   1. Limited change to business as usual
   2. Low to medium risk / moderate value creation

3. Step Change innovation – longer timelines
   1. Significant departure from business as usual
   2. High risk / technology critical part enabling substantial value creation

Roadmapping
Examples we investigated
Examples we investigated

Roadmap Results: Summary of Major Findings

- Robotics technology holds the potential to transform the future of the country and is expected to become as ubiquitous over the next decades as computer technology is today.

- Through adoption of robots in flexible manufacturing, it is possible to generate production systems that are economically competitive to outsourcing to other countries with lower wages.

- A key driver in adopting robotics technology is the aging population that results in an aging workforce but it also poses a number of challenges to the healthcare system.
It started as a volunteer initiative

- Launched by 3 co-founders / chairs
- Affiliated to SPE, IADC, AUVSI
- Will embrace other organizations – IEEE, .......
- Core committee driving process
  - Shell, UT, SWRI, IRIS, SLB, Transocean, NOV, .......
- DSA Roadmap Virtual Forum fully open
  - You can join – info at end of presentation
Identified best roadmapping process

- Sandia National Laboratories Technology Roadmapping - Unlimited Release
  - Adopted by IEA for Energy Technology Roadmaps Guide
  - Wikipedia – copy of Sandia Nat Lab
Affiliated with:

SPE ATCE – DSATS Symposium 29 September 2013
Presenter: John de Wardt
Streams will be defined through the map

Examples include:

- Interoperability
- Autonomy
- Robotics
- Communications \ Cyber Security
- Human Factors \ Artificial Intelligence
- Sensors \ Software
- ???????
Goals of the DSA Roadmap

• Enable the industry (internal / external) to see the potential way forward
• Address high-risk automation development challenges to create high-reward solutions
• Enable management / investors to see the value beyond the risks
• Drilling Systems Automation Roadmap Report!
Open forum for participation

• 3 co-chairs driving the initiative
• Advisors – icons from automation
• Selected committee with spectrum of experts steering the initiative
• DSA Roadmap virtual forum (web based) – open to all
  • Highlights on public facing website
  • Work process / detailed work inside SPE
    • Provided by SPE
DSA Roadmapping Program has launched

- Leadership in place and active
- Process defined and adopted
- 70% committee formed and active
  - Defining Needs, Scope, Boundaries & Vision
- Virtual forum will be open through SPE HigherLogic site
Drilling Systems Automation Roadmap industry initiative exists to create a tool to guide the development of this important emerging technology through a cross industry collaborative program.

OUR AFFILIATES

- Society of Petroleum Engineers
- International Association of Drilling Contractors
- Association for Unmanned Vehicle Systems International
### Needs are being defined

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<th>Topic</th>
<th>Details</th>
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<td><strong>Well Complexity</strong></td>
<td>• More difficult profiles, tighter bottomhole pressure margins</td>
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<td>• Automation mitigates risk and controls costs on complex wells</td>
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<td><strong>Data Overload</strong></td>
<td>• More real-time measurements, more parallel complex operations</td>
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<td>• Automation can manage, interpret and act on large volumes of data</td>
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<td><strong>NPT Significant</strong></td>
<td>• NPT accounts for 35 to 40% of deep-water drilling costs</td>
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<td>• Automation minimizes NPT by responding predictably to events</td>
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<td><strong>Well Manufacturing</strong></td>
<td>• Will drill many similar profile wells per field</td>
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<td>• Automation will repetitively drill to plan with minimal risk and cost</td>
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<td><strong>Expert Resources</strong></td>
<td>• Operations starved for expertise — increasing NPT, risk and cost</td>
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<td>• Automation will make available scarce expert resources</td>
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<td><strong>Knowledge Transfer</strong></td>
<td>• Skilled employees will exit the drilling industry in the near future</td>
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<td>• Automation can transfer knowledge from skilled to new employees</td>
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<td><strong>Health, Safety, Environment</strong></td>
<td>• Driver is to make the work environment a safer place</td>
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<td>• Automation will reduce the number of people in “red zones.”</td>
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“Speaking for US land, there are currently roughly 40,000 people employed on the rigs for drilling contractors,” said 2013 IADC vice chairman Jay Minmier, president of Nomac Drilling. “Historical attrition rates have been 30% to 40% so we are talking about 10,000 to 12,000 new-hires per year just to sustain, not including growth. It’s safe to say that we are looking at needing 20,000 to 25,000 people to come into the industry in the next two years. And if you include the worldwide offshore market, it may be double that amount.” Source: IADC
Vision - Vail ATW 2012  
SPE 163146

- Land based autonomous drilling systems with remote control – 10 years / possibly 5 years
- Interoperability between sub systems
- Significant improvement in sensors
- Up load the well plan
Surface mines of the past, present and future

- Land based autonomous drilling systems with remote control – 10 years / possibly 5 years
- Interoperability between sub systems
- Significant improvement in sensors
- Upload the well plan

The future is now!!

Bin there, dun that!
Join us in the roadmapping process through our virtual world!
Collaborate.

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or
dsaroadmap@iadc.org

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See - http://connect.spe.org/DSARoadmap/Home/