Automation and Optimization, Double the benefits if you combine them both
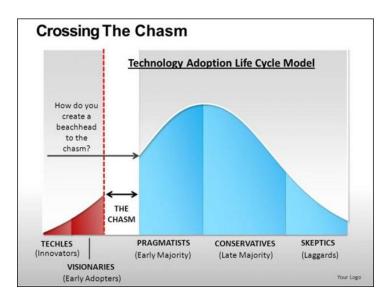
Tony Pink, NOV

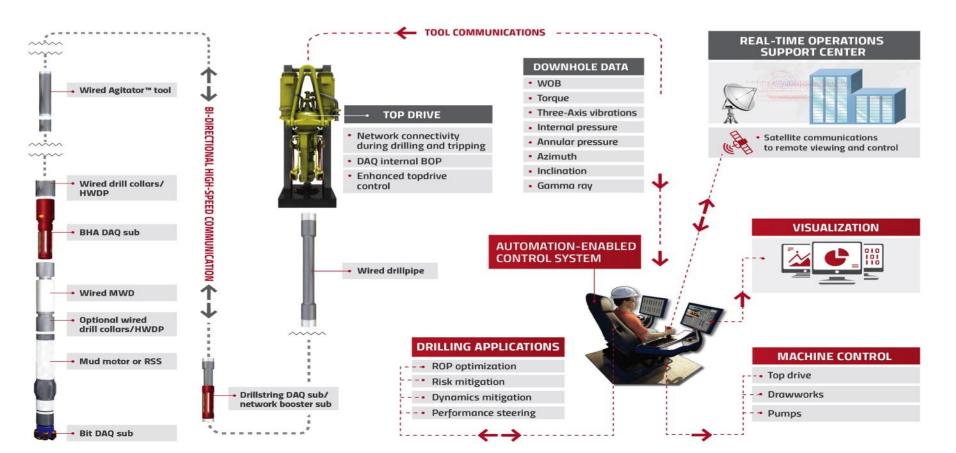# Automation and Optimization, the changing landscape

2010-2014

- Too busy
- Making too much money even when inefficient
- Too much effort to change
- Few visionaries in customers offices

2015-2016

- Downturn
- Challenging Economics
- Have to change
- Innovative ways to save money
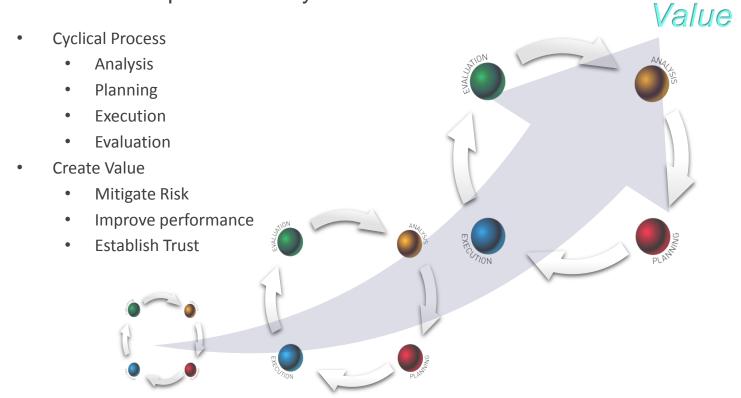- Automation capable of significant cost reductions
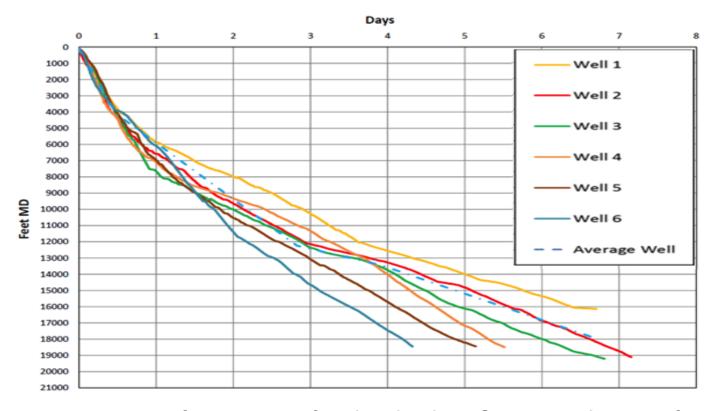
Closed loop downhole automation

Automation and Optimization Process

Continuous Improvement Cycle

- Cyclical Process
  - Analysis
  - Planning
  - Execution
  - Evaluation
- Create Value
  - Mitigate Risk
  - Improve performance
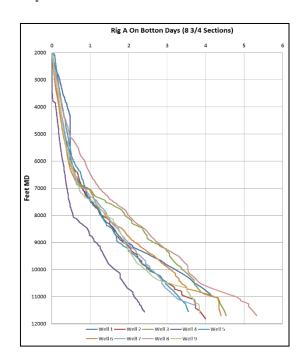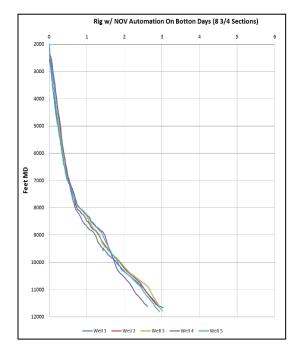 - Establish Trust

Value

Case Study – Eagle Ford (US land)

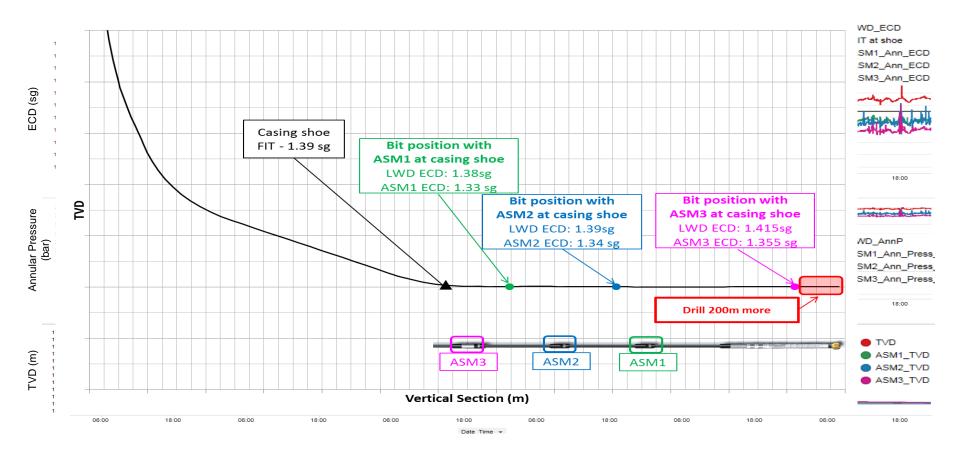**More than 37% reduction in time from previous pad**

Normal Humans + Automation + Optimization = Exceptional results

Value – More Reservoir

Maximizing Performance from Multi-tier Automation

Rig B – Surface Automation
- *Remote ops*
- *Stick Slip Control*
- *MSE optimization*

Rig D – Surface Automation
- *Remote ops*
- *Stick Slip Control*
- *MSE optimization*

Lead Rig – Downhole Closed Loop Automation
- *WDP*
- *High speed tools*
- *Automated Apps*

Rig C – Memory Tools, Optimization
- *Remote ops*
- *Memory Dynamics subs*

Rig E – Data Capture, Analytics
- *Remote ops*

Drilling Parameters and Lessons Learned

Value Creation for the Operator

- Reduced well delivery time
- More production from same rig fleet
- Consistency and repeatability of performance
- Improved decision making
- Enables remote operations and efficient knowledge capture
- Early gains in performance on challenging assets
- Transfer learnings across operator's rig fleet

Value Creation for the Contractor

- Differentiation
- Integrated Services
- Higher day rate
- Downturn protection
- Business acceleration after downturn
- Improves driller competency and performance
- Drillers go back to being drillers not just equipment operators
- Equipment efficiency
- Easy to do business with the Operator

THANK YOU

QUESTIONS & COMMENTS

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