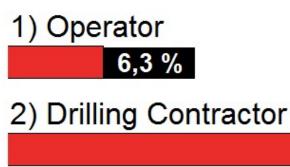
# **Industry Response Panel** Automatic Response System – Results

IADC Advanced Rig Technology Conference & Exhibition



1. What is your industry segment?



22 %

3) Equipment Manufacturer



## 5) Others

11 %



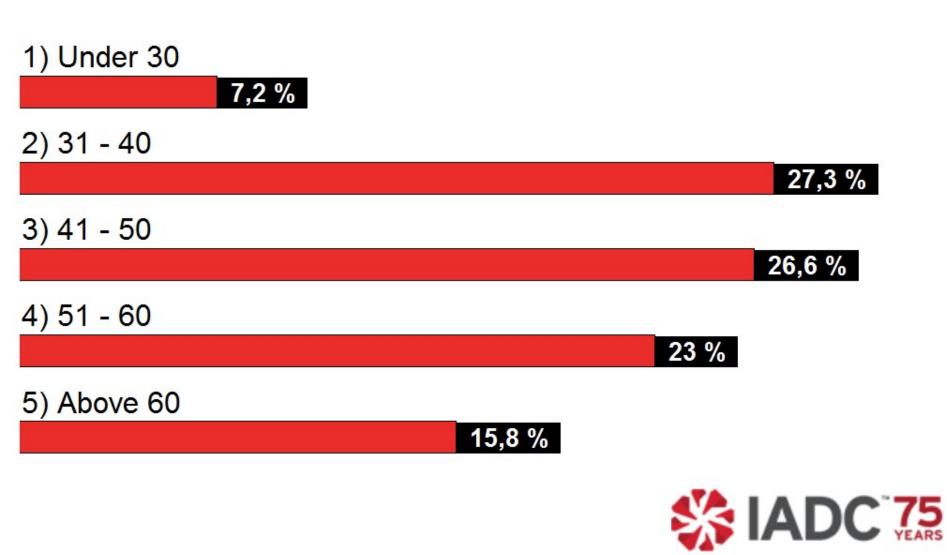
49,6 %

2. What market segment accounts for the majority of your operations/business?

 Onshore conventional 23,8 % Onshore unconventional (tight gas, shale, coalbed methane) 12,3 % Offshore, less than 500-ft water depths 9,2 % 4) Offshore, 500-5,000-ft water depths 23,1 % 5) Offshore, water depths beyond 5,000 ft 31,5 %



3. How old are you?



4. Does a downturn market encourage or discourage implementation of automation?

## 1) Discourages: Can't afford the investment

17 %

Encourages: We must differentiate our selves and automation is a great differentiator

3) Depends on customer support/requirements





40 %

38,5 %

5. What will accelerate the adoption from other industries of modern technology applications not used in drilling?

### 1) Skill sets of a new generation of drillers



2) Industry leaders to adopt and implement new technology

3) Oil company investment in more R&D 10,8 %

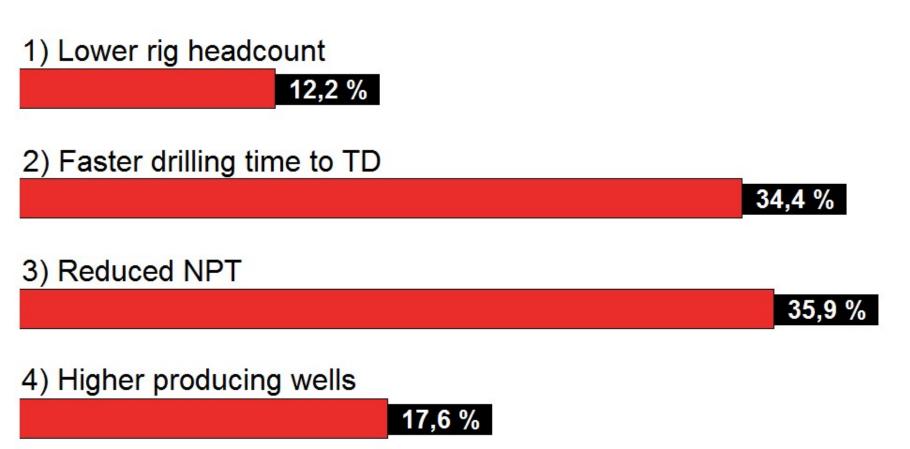
4) Need for improved efficiency

36,7 %
 5) Not necessary: Drilling industry can implement its own solutions without input from outside
 2,2 %



43,9 %

6. Of the following, which represents the most desirable deliverable from Drilling Automation?





7. Of the following, which represents the greatest immediate 'need' for the Drilling Industry?

1) Human Resources (e.g. skilled manpower) 26 %

2) Higher levels of drillfloor automation

3) Higher resolution of downhole instrumentation and control

18,3 %

4) Faster speed of data and communication

11,5 %



44.3 %

- 8. Hardware in the Loop (HIL) testing is a QA/QC method of validating software without necessarily having the 'big iron' immediately available. Where would you see its primary value as a testing method?
- 1) During the initial system development and engineering

48,1 %

- 5) Questionable value due to unsupported business case





9. What are the major barriers to uptake of automation in well construction?

21,7 %

1) Status quo - what we do today is fine?

2) Reliability is an issue?

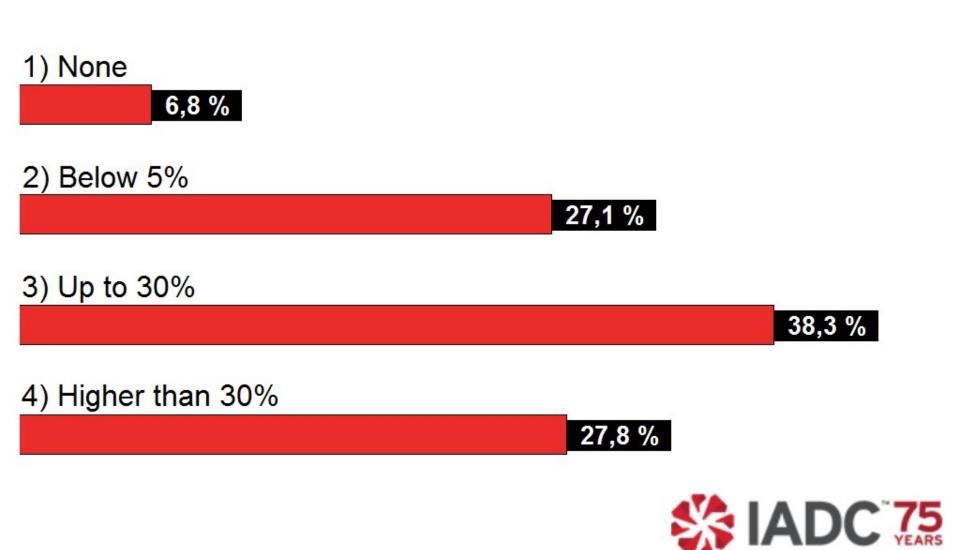
3) Increase in operational efficiency has not been proven?

37,2 %



41,1 %

10. What percentage of rigs may in 20 years run autonomously?



11. What system in the next five years will be fully automated on 30% of drilling rigs?

1) Tubular handling

48,1 %

2) Drilling and tripping

26,3 %

3) Directional steering downhole 13,5 %

4) Well Control

3,8 %

5) Fluid systems and solids control 8,3 %



12. In 10 years, what should be the tasks of the modern drilling crew?

- 1) Same as today 6,2 %
- 2) Supervisory with manual incident handling
- Purely maintenance and logistics rig processes otherwise controlled from off-site



 No crew on rig. Task force sent to rig only for inspection and maintenance





62,8 %

13. What is the biggest obstacle to innovation in automated well control systems?

1) Safety risk

2) Contractual liability

37,4 %

3) Lack of enabling technology 15,3 %

4) Entrenched mentality (not on my rig)

25,2 %

22,1 %



14. What area of the BOP Control Systems needs the most attention or improvement?

1) HPU/hydraulic systems

2) Cables (umbilicals and connectors)
10 %

18,5 %

3) Control electronics and software

53,8 %

#### 4) Valves



