Robots Promise Greater Productivity Amid Oil Slump

Fall in fuel prices has mixed effects on the U.S., global economies, but drones and robots could help energy industry.

By Emmet Cole

February 08, 2016

The drop in global oil prices is having a major impact on the global economy. But what effect is it having on the robotics industry, and which companies are best placed to succeed?

The drop in crude oil prices over the past 18 months—from more than $100 a barrel to today's less than $30—is having a far-reaching effect on the oil industry.

America's oil companies have mothballed oil rigs and laid off more than 150,000 workers. Oil companies and states have shelved new production plans, and capital spending has been reduced.

Falling oil prices are a mixed blessing for the U.S. economy as a whole.

While the sustained drop in crude prices should add roughly half a percent to U.S. GDP, according to the Dallas Fed, states like Texas can expect overall employment numbers to tumble if prices stay below $30 a barrel.

Meanwhile, analysts at the Council on Foreign Relations predict the the low prices will boost job growth in states that are less reliant on the oil industry.

So where do robotics companies fit in?

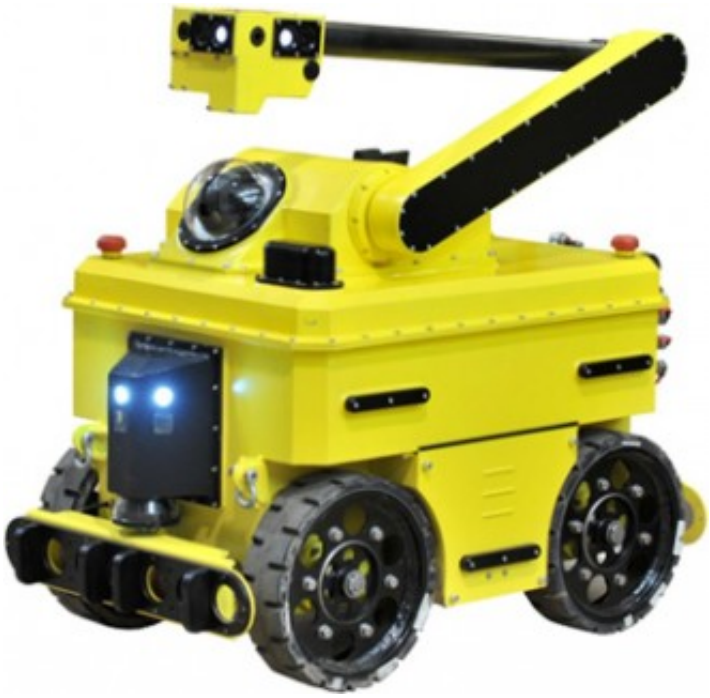
From remotely-operated aerial drones and automated underwater vehicles (AUVs) to robotic drills, intelligent machines are widely used for prospecting, extraction, inspection, and transportation.

Robots reduce human intervention, increase operational efficiency, and improve safety in mines and on oil rigs.

Remotely operated vehicles (ROVs) can enable engineers working in a central location to advise workers across numerous sites.

Robots bring many benefits to oil industry, but most notably in reducing "non-productive time" (NPT)—which is extremely costly to those operating expensive rigs.

Meanwhile, advanced sensors can be used to collect real-time data on well conditions. That data can then be fed to algorithms to modify operations much faster than a human ever could.



Shell and CMU's Sensabot is designed for on-site inspections.

Oceangoing ROVs can provide inspection, pollution monitoring, and even security services. ROVs have some inherent limitations, however, most notably a limited depth range because of umbilical cables.

Some ROV models are unable operate in shallow waters or in locations with strong water currents and turbulence.

Industry players

Oil company Royal Dutch Shell PLC and Carnegie Mellon University have developed the Sensabot—a robot designed to withstand extremes of weather and temperature while it inspects oil and gas equipment and aboveground pipelines.

Sensabot can carry out on-site inspections in hazardous and isolated environments.

Alstom Inspection Robots Ltd. created the FAST Remote Video Inspection system for monitoring of tanks, vessels and pipes.

Another leading player is Honeybee Robotics Ltd., which develops robots for remote access and in-situ monitoring in the mining, oil and gas sectors. Honeybee provides systems for autonomous drilling, automated sampling, in-situ analysis, geotechnical characterization and remote access.

Honeybee Robotics sells robotics for remote access.

IKM Subsea sells the electric-powered Merlin class series of ROVs, which promises increased reliability than its competitors because each thruster has a separate topside power supply from topside.

Price dive
So how are robotics companies faring in the new oil industry reality of prices $30 per barrel?

The simple answer is: It depends on the company.

Let's start with a positive. One major player in the oilfield gear market is turning to robotic drilling systems and big data to weather oil's price drop.

National Oilwell Varco Inc. (NOV), is the world's largest builder of oilfield equipment, with sales of $21 billion in 2014, according to *Forbes*. However, as oil prices plunged, so too did NOV's sales, which fell by 26 percent in one year.

But where others see disaster, Clay Williams, CEO of NOV, sees opportunity.

Page 1 of 2
1 2 Next »

About the author

Emmet Cole

Emmet Cole has been writing about robots since 2006. Formerly Wired UK's robotics expert, Emmet's bylines include Wired News, The Economist, BBC Future, and Robotics Trends. He is particularly interested in commercialization of research and in the ethical, legal, and regulatory implications of emerging robotic and cyborg technology. Twitter: @roboticsviews

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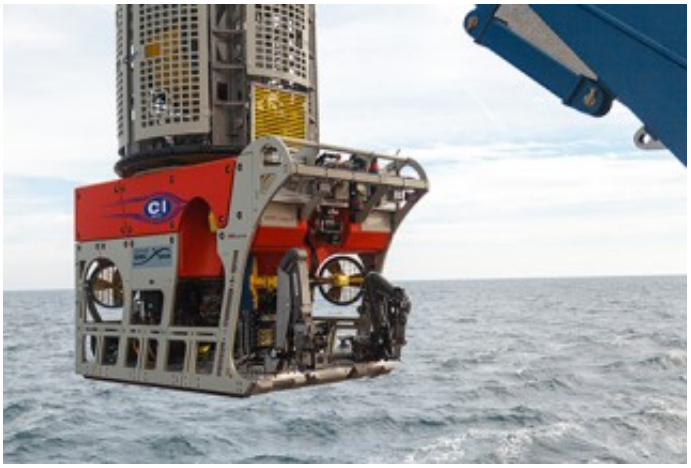
“Busts have a bright side—oil companies get interested in learning new tricks,” Williams said. “In the $100-per-barrel world, there’s not much incentive to do things differently, because everybody’s making money. But in a $50-per-barrel world, reality sets in, and our customers say, ‘How can we do things differently? How can we make the economics work?’”

This has created opportunities for the well and drilling automation technologies that NOV has been developing for years. NOV’s automated wells have an operating speed that’s an estimated 40 percent faster than human-operated equivalents.

Faster drilling reduces overall drilling costs. If it costs about $20,000 a day to contract an onshore drilling rig, then reducing your drilling by four days can bring an immediate savings of $80,000. The potential savings on offshore rigs, which can cost more than $100,000 per day, is even greater.

Currently, automated drilling accounts for less than $100 million of NOV’s business, but the company’s automated drilling division is hiring, and it clearly expects to experience growth over the coming years, regardless of the oil price.

Other companies haven’t fared as well.



Shilling Robotics makes submersibles for oil rigs.

In May 2015, undersea robot maker Schilling Robotics laid off 59 workers—nearly a quarter of its staff—in response to falling oil prices.

Schilling Robotics designs and manufactures remote-controlled submersibles and manipulator arms for use in exploration, construction, and maintenance work on offshore oil platforms and drilling rigs.

Remember that those job losses came when oil was trading at around $60 a barrel, more than twice of what it is at the time of this writing.

Schilling declined to answer our questions about the overall outlook for the robotics industry in light of the oil industry downturn, but parent company FMC Technologies provided *Robotics Business Review* with the following statement:

As a result of the dramatic decline in oil and natural gas prices and the resulting decrease in activity from our customers, FMC Technologies has undertaken a number of efforts to adjust our business. As part of these efforts, it has become necessary to evaluate the current size of our workforce. As a result, we have made the difficult decision to reduce our headcount while we continue restructuring the organization.

Low-water mark

Low oil prices are resulting in devastating consequences for a number of companies, said Colleen Kennedy, a research analyst at Lux Research Inc.

"FMC has a very strong reputation for providing offshore robotics, but unfortunately offshore and deep-sea projects are among the most expensive in the industry, making them exceptionally vulnerable right now," said Kennedy, author of a recent report entitled "Identifying Ways to Reduce Drilling Budgets in the Low Oil Price Environment."

"There will be a decrease in mega projects as operators cut budgets," she said.

If oil prices remain at their current low levels for another year, we can expect to see a shift in demand in the robotics industry, explained Kennedy.

"There could be less subsea completions and more decommissioning," she said. "There will still be an interest in developing robotics for streamlining and improving rig operations but maybe with a heavier focus on land rigs."

The companies most likely to succeed in this environment are those selling "low-risk technologies that

won't interrupt drilling activity, even if they fail," Kennedy noted. This is because operators are less likely to take risks in the current pricing landscape.

Schilling Robotics' experience reflects the decline in exploration activity. Other robotics companies look likely to benefit from the price drop as oil companies turn to robotic systems to reduce drilling costs and decrease NPT.

State of play

For Kennedy, two types of company will do best. The first are those that specialize in robotic drilling, and the second type includes oil and gas technology start-ups with a robotics focus.

"Contingency costs arising from NPT typically account for about 10 percent to 15 percent of total drilling costs and can rise as high as 30%, so start-ups with technologies that reduce NPT can make for attractive opportunities," she said.

Robotic Drilling Systems AS (RDS), for example, looks well-positioned to benefit from the current state of play in the oil industry. The Norwegian company has developed a robot system that enables unmanned drill-floor operations.

The robot, which is designed to enable precise work operations between electric drill-floor machines, can be fitted on new and old wells and on both land and at sea.

RDS's technical partner and largest shareholder is Norwegian drilling contractor Odfjell Drilling. Companies with existing ties to oil companies are well-positioned.

In September 2015, RDS successfully installed the world's first drill-floor robot at the IRIS Ullrigg Well Centre.

Energy robotics prospects

So, what are the overall prospects for robotics companies in the coming years?

Even if oil prices remain low and there is a slight decline in the market, Kennedy said she remains "absolutely optimistic" for the future of robotics companies in the oil and gas sector.

"The industry has already shifted to a 'factory' mentality in some basins, which has resulted in decreased drilling timelines and budgets," she said. "Also, many operators are aware of the untapped potential of drones and AUVs."

"Although there may be a supply glut and decline in drilling activity currently, the enormous amount of infrastructure—pipelines, platforms, etc.—created by the oil and gas industry means there are still vast opportunities for robotics," said Kennedy.

The market for inspection robots will experience a compound annual growth rate of 20.46 percent from 2014 to 2019, according to a bold prediction by Research and Markets.

One of the main drivers for this growth is an expected increase in offshore drilling activity, said the research firm.

"There is increased interest in extracting oil and gas from offshore to ensure supply to meet the increasing worldwide demand especially due to the continued depletion of onshore resources," the report said. "Offshore oil and gas explorations represent an untapped yet expensive and inaccessible supply of valuable resources."

More on Robotics for the Energy Industry:

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- Robotics Research at the Colorado School of Mines Ranges Far and Wide

So where does the truth lie?

I'm inclined to agree more with Kennedy's analysis and less with Research and Markets' prediction.

There are reasons to be optimistic—but that optimism should be applied to specific companies providing specific, often niche, technologies to the oil sector.

It's hard to see the levels of growth predicted by Research and Markets actually occurring. And even in the unlikely event of the oil robotics sector as a whole enjoying tremendous growth, that growth and success is likely to be enjoyed by a limited number of players.

About the author

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