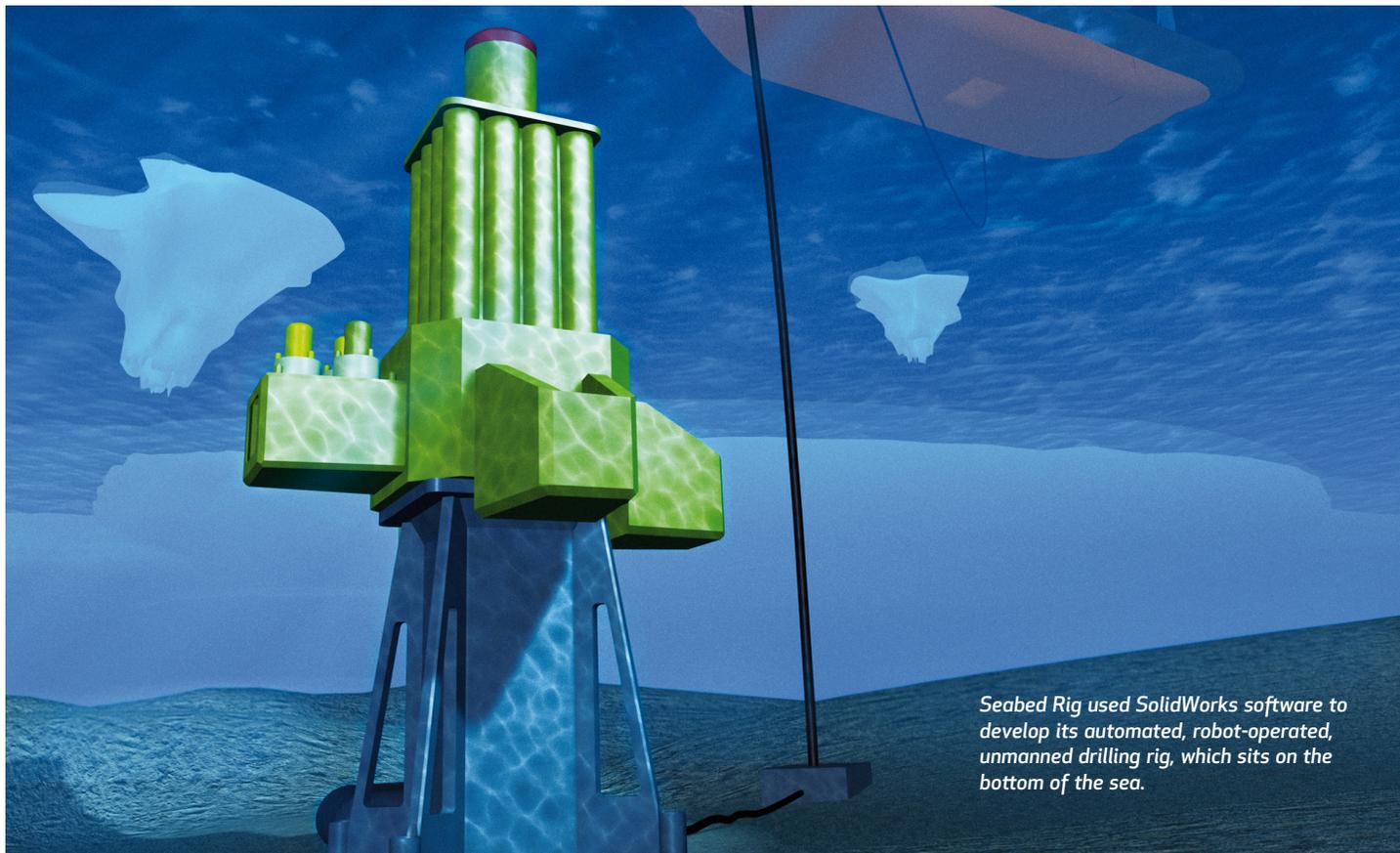


SEABED RIG AS

Innovating a safer, better approach to deepwater drilling with SolidWorks



Seabed Rig used SolidWorks software to develop its automated, robot-operated, unmanned drilling rig, which sits on the bottom of the sea.

Half of the world's remaining oil reserves lie beneath the oceans' depths. Getting to them—especially in deep water or in the Earth's ice-covered Polar Regions—presents distinct engineering challenges, ranging from weather- and ice-related issues to the environmental and human safety risks associated with operating deepwater drilling platforms.

Norway-based Seabed Rig AS has invented a better, safer method for tapping this underwater resource. By developing an automated, robot-operated, unmanned drilling rig that sits on the bottom of the sea, the company has resolved problems related to weather-tossed seas, darkness, floating icebergs, and pack ice. Instead of building an offshore surface platform to drill for oil and gas at the seabed, up to 3,000 meters below, exploration companies can use the Seabed Rig system to drill on the sea floor using robotic systems, with only a support vessel at the surface. The Seabed Rig also eliminates the potential for human error, is safer, and costs less than conventional drilling platforms.

To develop this revolutionary drilling technology—and the equipment required to operate it—the start-up company, which was founded in 2005, needed an efficient 3D development platform, according to Chief Technology Officer Kenneth Mikalsen.

"We needed a capable, powerful 3D CAD system to design the different types of equipment and robots that we use and to handle the extreme size of our final assembly," Mikalsen notes. "The engineers involved at the start-up phase had a lot of experience designing with SolidWorks® software. We didn't bother to evaluate other 3D modeling programs because we understood how SolidWorks could help us address the challenges we faced."

Challenge:

Develop an innovative, robotics-based system for oil and gas drilling and production on the seabed that does not require a conventional drilling platform.

Solution:

Implement SolidWorks Professional software to drive development, streamline interaction with suppliers, and enhance design visualization.

Results:

- Shortened development cycles
- Streamlined interaction with suppliers
- Created innovative 3D visualization and control module
- Developed next-generation automated drilling system

Seabed Rig chose SolidWorks Professional software to develop its automated drilling system because it is easy to use and provides robust large-assembly design capabilities. The company also values how SolidWorks facilitates collaboration with its team of consultants and subcontractors, most of whom already use SolidWorks. "We picked SolidWorks because we already knew that it was the tool that we could use to accomplish our task," Mikalsen stresses.

Compressing design time

Using SolidWorks software to design the multiple robotic systems on the Seabed Rig, such as the drill-floor robot, the pipe-handling robot, robotic lifts, and hoist machinery, the company's engineers were able to cut design time in half.

"Compared to 2D, we're at least 50 percent faster designing in SolidWorks," Mikalsen says. "For a project of this size, with all of the different pieces of machinery that have to work together, our only real option was to use 3D. SolidWorks allows us to fully investigate our model in 3D."

SolidWorks also streamlines interactions with Seabed Rig's vendors and facilitates communication with nontechnical professionals. "Because we have good data compatibility with our suppliers, we avoid delays and additional costs. We actually expect our vendors to use SolidWorks," Mikalsen explains. "We also use SolidWorks eDrawings® files to communicate concepts to professionals in our company who are not engineers."

Driving 3D visualization

In addition to facilitating design, SolidWorks 3D capabilities helped Seabed Rig develop its unique 3D visualization and control system for operating the rig's automated systems. Older technology relied on underwater video camera-based systems for observing the activities of robotic equipment. This approach had disadvantages, such as poor image quality under the low-light and turbid conditions on the ocean floor, and the need to move large amounts of data.

Seabed Rig's "Visualizator" uses SolidWorks 3D models and a system of sensors and motors to create a virtual representation of the rig that mirrors reality. With this approach, operators can navigate around the rig inside the control system. "You can fly around and zoom in to different parts of the rig, and the amount of data that we need to transmit is so much smaller that you can run the Visualizator over a mobile phone connection," Mikalsen points out.

Demonstration project just the first step

Seabed Rig installed its prototype drilling rig at the *Forus Teknologipark* in May 2010. The prototype is part of a demonstration project to show the world's oil and gas exploration community how the Seabed Rig technology operates. The next step will be an actual seabed deployment.

"We have come a long way since our founding, and SolidWorks has been an important tool for helping us develop our technology," Mikalsen says. "We are satisfied with SolidWorks and will continue to use it as we work to change the way deepwater drilling is done."

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Kenneth Mikalsen
Chief Technology Officer



Using SolidWorks software, Seabed Rig can more effectively collaborate and communicate with its strategic partners and vendors.



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