Technology In Our Lives

Visualization And Animation Tools Model Russian Sub, Simulate Its Recovery

(NAPSA)—On August 12, 2000, during a Russian military exercise, the K-141 Kursk, an Oscar II class submarine built in 1994, sank in 110 meters of water in the Barents Sea. All 118 officers and men on board were lost.

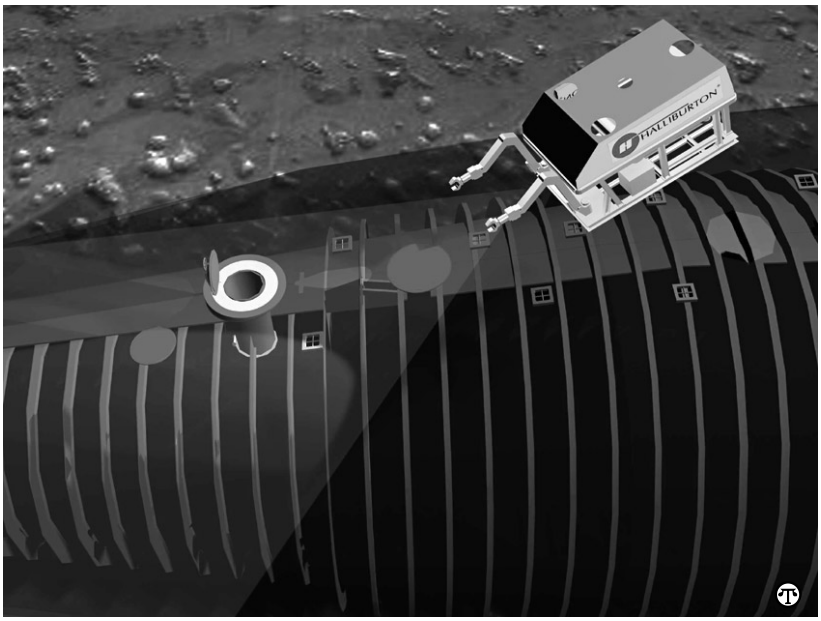
The primary goal of the salvage operation is to neutralize all potential environmental dangers emanating from the sunken sub. Raising such a large vessel—154 meters long, with a displacement of 18,300 tons—presented a formidable challenge.

In order to plan its recovery, the project team had to determine how and where to attach lifting clamps to the hull, how much stress the hull frame could withstand and how sea currents might affect the submarine and recovery craft during the lift. The salvage team employed Autodesk visualization and modeling tools to help plan the operation.

AGS, of Horten, Norway, created a 3-D model of the submarine and an animation of the entire recovery operation. Working from paper-based drawings, AGS then created a digital model of the submarine using Autodesk Inventor software.

"The modeling and animation took approximately 10 working days," said senior AGS consultant Geir Ove Augestad. "We were given the project as a matter of urgency and wanted to demonstrate how quick and efficient the software is. Without Inventor, it could have taken as long as three months to achieve similar results."

Initially, the team was given manual drawings in a folder from the Russian designers and only at the very end did the team get the correct digitized construction blueprints. However, it turned out that there were differences between the initial drawings and the digital blueprints.



Computer visualization software is helping make an international salvage operation possible.

"Using Inventor, we solved this by adjusting the parameters and let the system calculate all the changes," added Augestad.

Preparations for the recovery will begin with a survey of the submarine using divers and remotely operated vehicles (ROVs). The damaged bow section of the sub will be cut away prior to the lifting operation. The lifting points determined from the digital model will be marked on the hull so that holes can be cut at these points, avoiding the section of the hull that houses the submarine's two nuclear reactors. Obstructions between the outer hull and the inner pressure hull will be cleared to gain access to the pressure hull ring stiffeners, strong points in the hull that can bear the weight of the sub as it is raised. Finally, custom-made lifting clamps will be attached to the ring stiffeners.

The next phase of the operation involves modeling the crane, barge and diving ship that will work together to raise the Kursk and animating the interactions between them throughout the lift. A barge will be positioned over the submarine, then the world's biggest crane vessel, with a lift capacity of 16,000 tons, will raise the Kursk off the seabed. The crane will not lift the flooded submarine out of the water; instead, it will position the Kursk underneath the barge so that it can be fasted to the barge and towed to Murmansk.

The international participants in the project are coordinated by the Kursk Foundation, an organization established by Russian and Dutch authorities. The foundation's goal is to neutralize potential environmental dangers presented by the submarine. The projected $70 million cost of recovering the Kursk will be shared by Russia and international donors. For more information, visit www.kurskfoundation.com.