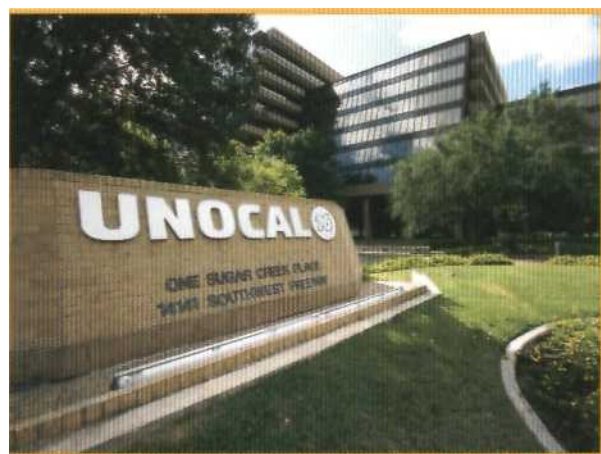


Solutions

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A Landmark Publication



Using OpenExplorer, Unocal explorationists cut cycle time 50 percent or more, reduced risk by 20 percent and increased NPV by millions of dollars.

Unocal Reduces Risk, Cycle Time in Brazilian Bid Round

When Unocal explorationists began evaluating acreage for Brazil's first open offshore bid round last year, they faced an enormous challenge. With little prior experience in the Brazilian offshore, they had to assess the economic value of prospective blocks in multiple basins spread over an area comparable in size to the Gulf of Mexico.

"We obtained our first data in late February 1999," explains Gregg

Blake, senior consultant stratigrapher for the Brazil Resource Assessment Team. "And we had just three months to submit our bid proposal to the government."

When Dr. John Baines, the team's supervisor, learned about Landmark's recently-released OpenExplorer™ Desktop software, he decided to pilot test it on the Brazil project. OpenExplorer is built on the OpenWorks™ database and ArcView™, an industry standard geographic information system (GIS).

"In frontier exploration, we use any kind of data we can get—satellite imagery, gravity/magnetic data, maps and diagrams out of the literature, or JPEG files off the Internet," says Blake. "But we also wanted to link back to OpenWorks, so we could integrate all this 'non-conventional' data with standard structure maps, isopachs and cross sections. The only way to do that was through OpenExplorer."

Integrated Workflow The Brazil team's geophysicists already used SeisWorks™. About a month after the team's two geologists received new Landmark workstations, the ANP-1 Bid Round data package arrived. It included a considerable amount of published literature.

regional 2D seismic lines, and data from 80 of the approximately 4,000 wells drilled in the Brazilian offshore. The team evaluated blocks in three of the most important basins—Santos, Campos and Espirito Santo.

For this project, Unocal's explorationists did not use OpenExplorer so much for "data management" as they did for "visual data integration" or, as Dr. Baines calls it, "pattern recognition"—a rather unique application of the technology. The combination of GIS tools and OpenWorks database enabled them to scan any kind of map, "georectify" it—that is, attach geographic coordinates such as latitude and longitude—and then overlay any number of digital images (including

maps from SeisWorks and StratWorks™) to create a single, more comprehensive image of a region, basin or prospect.

"This process is critical for us," Blake stresses, "because, in the past, most of this information was just different pieces of paper. You could hang them on the wall or lay them side-by-side on a table. Now we can look at four or five different layers at once, all at the same scale."

Based on extensive analysis and interpretation of the data, the team presented its recommendations in the spring of 1999. As a result, a bid was submitted on two deepwater blocks.

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Competitive Advantage

(continued from page 1)

On June 16, 1999 Unocal and its partners, Texaco and YPF, announced their successful bid for a block in the Espirito Santo Basin. Currently, they are shooting 3D seismic. Exploratory drilling could commence by early 2001.

According to Blake, the team's innovative OpenExplorer workflow was critical to their success. "OpenExplorer helped us integrate all of our information in one place, which reduced our cycle time," he notes. "Working any other way probably would have taken two or three times longer. We had even more basins to evaluate for the second ANP Bid Round, but our cycle time already got shorter. What used to take us months, we did in weeks."

Unocal Reduces Risk, Cycle Time in Brazilian Bid Round

Lower cycle times mean lower costs as well. "Cost savings, by working faster, are in the order of hundreds of thousands of dollars, and perhaps as much as one or two million," he observes.

Even more important, however, is risk mitigation. "We have a fairly stringent risking procedure at Unocal," says Blake. "The whole team gets together and risks all five elements of the petroleum system: trap, seal, reservoir rock, source

and migration pathways. By bringing all the data together in one place, we had about a 20 percent decrease in risk. That, of course, had a direct impact on NPV. I don't know exactly what that figure is, but the net to Unocal must be tens of millions of dollars."

According to Blake, since every multinational oil company receives the same data package in a Brazilian offshore lease sale, the only way to gain an edge over competitors is by "doing something different" with the information.

"Ultimately it's your workflow that gives you the competitive advantage," he says, "not the data itself."

Spread of Methodology

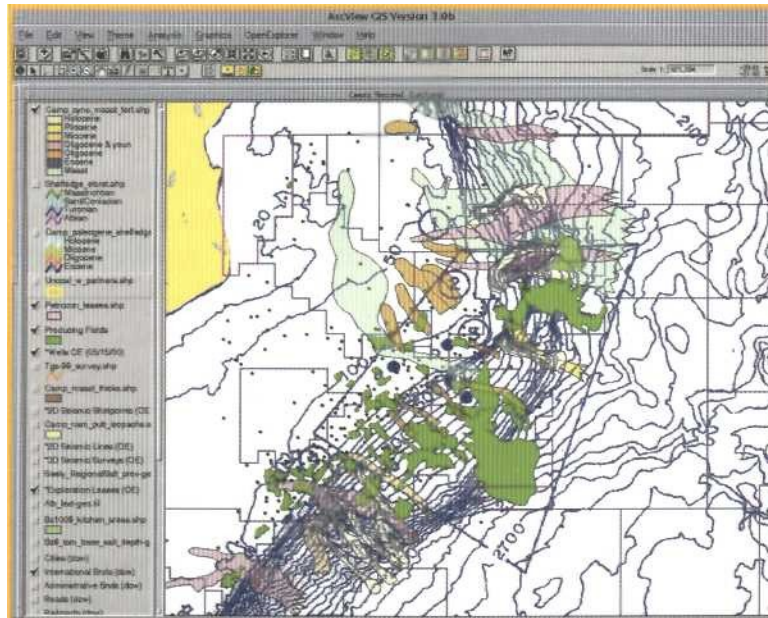
Since completing its successful pilot test, the Brazil Resource



Geologist Gregg Blake (left) and geophysicist Jon Finstuen, two members of Unocal's Brazil Resource Assessment Team. "What used to take us months we did in weeks."

Assessment Team's OpenExplorer GIS-based methodology has spread to Unocal's other frontier exploration teams.

"By no means, however, is it limited to frontier," Blake concludes. "You could use it effectively in a very mature region as well. You could start with tectonic features and then, with the click of a button, zoom in on a basin or block. With UTM coordinates, you can get down to the same level of accuracy as seismic or well data."



OpenExplorer enabled team members to integrate submarine canyons interpreted from SeisWorks and color-coded by age with "georectified" data from articles, producing fields and bathymetry.