Distinguished Achievement Award for Saudi Aramco's EXPEC ARC Geophysics Technology

Geophysics Technology of Saudi Aramco's EXPEC ARC (Advanced Research Center) has made significant contributions to the advances in land seismic acquisition and processing—in particular, complex near-surface characterization, multiple elimination, imaging, and coherency technology. Researchers at EXPEC ARC are widely published and have received industrywide recognition. EXPEC ARC continues to innovate in areas of emerging technologies such as automation in the seismic value chain, land geophysical monitoring, i-field, and multiphysics inversion.

by M. Nafi Toksöz

The largest upstream geophysics research group in the Middle East is one of the key pillars of Saudi Aramco's Exploration and Petroleum Engineering Center (EXPEC) Advanced Research Center (ARC). For many years, EXPEC ARC researchers have made significant contributions in geophysics, particularly in the area of land and shallow-water seismic acquisition and processing.

Geophysics Technology is tasked with finding new ways to acquire and process huge volumes of land seismic data in a challenging desert environment. Characterizing the complex near surface is critical for exploration success in the Arabian Peninsula. EXPEC ARC's geophysicists have developed novel algorithms resulting in improved definition of the complex near surface while reducing the required cycle time from months to days. Near-surface technology has moved beyond 3D traveltime tomography to full waveform inversion and the use of data-driven, model-independent imaging methods, such as common focus point technology. Saudi Aramco plays an important role in the SEAM Phase II Modeling Consortium focused on land seismic challenges.

EXPEC ARC is considered a world leader in the area of land multiple suppression technology. For the past 20 years, Saudi Aramco researchers have consistently published key papers in this area, and they continue their active collaboration with academic institutions on this challenging topic. In 2000, Saudi Aramco and Technical University of Delft published a landmark paper on land surface multiple attenuation strategies via wave-equation-based techniques. At SEG's 2010 Annual Meeting, researchers at EXPEC ARC, along with the University of Houston, presented the first practical application of inverse scattering-series technology for land internal multiple suppression.

EXPEC ARC is aggressively pursuing research in electromagnetic and gravity technologies to complement seismic for subsalt exploration in the deep waters of the Red Sea, for near-surface characterization, and for reservoir monitoring. As part of this effort, new simultaneous joint inversion algorithms using seismic and nonseismic data have been developed to lead the effort toward multiphysics inversion.

EXPEC ARC's recent initiative on robotics as a key transformative technology could revolutionize seismic acquisition in both land and marine applications. The SPICERACK, a multiyear development program being produced jointly with CGG, is another example of its long-term vision to bring automation to the seismic acquisition.

Finally, geophysicists at EXPEC ARC are active members of SEG and have contributed significantly to the advancement of our Society. They have organized numerous workshops in the Middle East, Europe, and North America. They have been involved in SEG committees, including the Executive Committee. Also, they have served the Society in many capacities such as Distinguished and Honorary Lecturers. EXPEC ARC professionals have been honored with numerous awards and recognized for their excellent publications and presentations including the Best Paper in GEOPHYSICS Award for 2010.

SEG proudly bestows the 2013 Distinguished Achievement Award on Saudi Aramco's EXPEC ARC Geophysics Technology for its substantial contributions in geophysics and for its commitment to research and development and for creating a scientific oasis in the desert.