

Russia's technological link

Education initiative trains next generation of geoscientists in new exploration technology and data processing

BY VIRGINIA HEFFERNAN

THE mineral potential is there. The geoscientists are highly educated. For the past few years, exploration spending has been robust. So why isn't Russia further ahead in the discovery of new mineral resources? The answer may come down to technology.

"There is a huge base of geologists, geophysicists and mining engineers in Russia with good professional education," says Victor Ovcharuk, director of AGT Systems, a geophysical equipment supplier in Moscow. "What's missing is applied knowledge of modern technology for exploration and mining."

Before the adoption of *perestroika* in 1987, Russia was one of the leaders in the development of new technologies for exploration. An established infrastructure of research, development and training ensured that exploration technologies were constantly evolving along with the technical expertise to operate them. Though the equipment was often inferior to similar products developed in North America, it served the purpose of supporting exploration for both minerals and oil and gas in the country.

That all changed with the dismantling of the USSR. Funding for research programmes, education and technology froze almost instantly. Equipment, while still being manufactured, became outdated and uncompetitive. Between 1990 and 2003, the state spent virtually nothing on exploration for mineral resources. Private companies contributed some expenditures, but many foreign companies stayed clear because of the perceived political risk of operating in Russia.

More recently, exploration spending has been climbing and would have continued to do so had the global economy not headed into a tailspin, affecting exploration everywhere. According to Halifax-based Metals Economics Group (MEG), spending in Russia – only US\$16 million in 2002 – reached US\$613 million 2007, making Russia the fourth-largest target for exploration expenditures worldwide that year.

But the increased spending has yet to pay off in significant new deposits. The ministry of natural resources has identified the low discovery rate as one of sector's main challenges. Because more than 50% of Russia's revenue stems from natural resources, replacing depleted reserves has become a top priority.

As a result, the ministry has agreed to double state spending on resource exploration to US\$23 billion from 2010 to 2020. About half of the money will be spent looking for oil and gas, while the rest will be used to find new mineral reserves including precious metals and diamonds, ferrous, non-ferrous and rare metals and uranium.

There is much to explore. Russia contains about 15-17% of the world's mineral deposits, which have an estimated value of US\$340-380 trillion, according to a special report on Russia published by *Mining Journal* in 2007 (*MJ* September 28, 2007). About 20,000 Russian mineral deposits have been investigated, and more than one-third of these have been mined and developed.

"Because we like big mineral deposits, we regard

Russia as prime exploration territory," said Tom Albanese, chief executive of Rio Tinto, in an address to the CIS Metals Summit in 2006, shortly after the global mining leader had signed a joint-venture agreement with Norilsk Nickel for exploration and development in the country. "Russia is vast, endowed with great resource wealth and under-explored using modern methods."

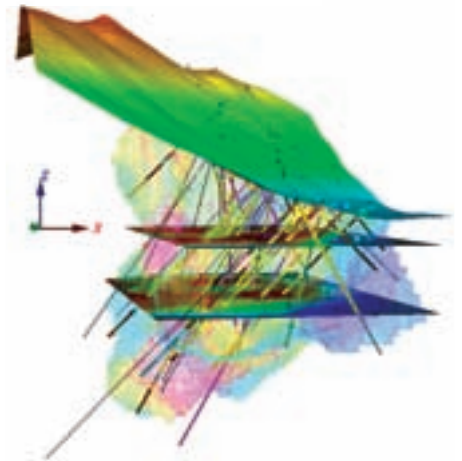
TECHNOLOGY AND TRAINING

While Rio Tinto is able to import and apply in-house technology and expertise to its Russian exploration programme, the state-sponsored programme will need to incorporate funding for modern technology and training if it is to succeed.

That's where AGT Systems, in co-operation with Geosoft and Perm State University in the Ural Mountains of Central Russia, is making a difference. Under a state-funded programme called Innovation Universities, which is designed to upgrade educational and research facilities at universities, the trio has established three teaching laboratories to train students in new exploration technology and data processing.

AGT Systems has served the Russian natural resource market for more than ten years, providing modern geophysical technology to both the private and public sectors. The company introduced the country to the walking magnetometer, an integrated high sensitivity instrument with automated GPS; the Scintrex Autograv, an automated gravity meter now common throughout Russia; and Oasis montaj, Geosoft's widely-used mapping software.

Now the company is focusing its attention on the next generation of Russian geoscientists. Although Geosoft software is the accepted standard in many research institutes and mining companies in Russia,



Working within a 3D environment is essential to mining exploration; this is a 3D view within Geosoft Target

including Alosa, Norilsk Nickel and Vostokgeologia, the state universities have been slow to adopt the technology, partly because of regulation that requires educational software to be in Russian, partly because the educators themselves have little knowledge of modern processing techniques and partly because there is reluctance to spend money on software over hardware.

"Most of the universities prefer to buy equipment," says Mr Ovcharuk. "The software is not considered a necessity by teachers and professors. But we are trying to promote the idea that modern technology without data processing software is not much better than a scrap pile."

As part of the education initiative, they have made introductory presentations for teachers and students, installed educational licences for Geosoft's Oasis montaj earth mapping platform and Target geology software on several computers, and provided training for teachers, as well as consulting and technical support. Perm State is the first university in Russia to use the software for education.

In close co-operation with Vladimir Kostitsyn, chief of the geophysical department of Perm State University's geological faculty, AGT and Geosoft have established three teaching laboratories at Perm State complete with more than 20 computer stations, each with Oasis montaj and Target licences installed.

"Now each graduating class will produce dozens of new experts who will be familiar and experienced with the most advanced mapping and processing tools, and can take these new skills into industry and government," says Mr Ovcharuk.

AGT and Geosoft plan to replicate the success at Perm State at all the universities throughout Russia. Their next target is the new regional state university in Krasnoyarsk, which is purchasing 20 education licences for Geosoft software this year.

"With over half of Russia's GDP derived from natural resources, partnerships like this are instrumental in unlocking future potential," says Wayne Higgins, managing director, Geosoft Europe Ltd. "Ensuring students have the right tools and technology to rapidly hone their skills within academic lab settings is key to building the work force and skill base required for exploration industries to develop and thrive in Russia."

Although it is too early to tell whether the investment in training and data processing will pay off in new mineral reserves for Russia, it is clear that without the investment in the next generation of geoscientists, maintaining the country's reserve base will be difficult if not impossible.



Drilling rig in East Siberia