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Sputnik to Glonass: Playing Catch-Up in Outer Space

By Alexander Bratersky

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Engineers working on a satellite for Glonass in Zheleznogorsk in 2006. **Ilya Naymushin**

Editor's note: This is the fourth of five articles about President Medvedev's efforts to modernize the economy.

On a quiet Sunday afternoon, a group of children gathered around a giant moon replica hanging from a wall in the Russian Space Museum.

"Work hard, so that we will be able to fly to the moon in three days," an elderly museum attendant urged the children. "I think the Chinese will be able to do it faster," replied one of the children's mothers.

Such reactions reflect the concerns of many Russians who see their country's former dominance in the field of space exploration being steadily eroded, as fast-developing upstarts like China begin to make inroads on Russia's aging Soviet-era space technology.

While most experts agree that Russia's space technologies still surpass those of China, they add that this might not be the case for long.

"Today they are not competitors, but Chinese space technology is developing fast," said Igor Marinin, a member of the Russian Space Academy and editor of the industry journal Novosti Kosmonavtiki.

President Dmitry Medvedev has numbered the development of space technologies among Russia's five priority directions for modernization and has repeatedly emphasized the importance of the country's space programs.

That puts him in the same company as his predecessor, Vladimir Putin, who said space programs would be among the country¹s top priorities, regardless of the financial situation. But despite the optimistic talk, the Federal Space Agency has remained chronically underfunded, a blow to a space program that put the first satellite, Sputnik, in space in 1957.

Finding Funding

Russia spent less than the United States and the European Union on space programs in 2009, Anatoly Perminov, head of the Federal Space Agency, said last year.

That is not enough for the country to regain its competitive edge, but it is still a big improvement from the mid-2000s.

"It was sad to answer questions [regarding financing for space programs] two or three years ago," he said in the radio interview last year.

In 2009, the Federal Space Agency's budget was about $2 billion, compared with more than $3 billion for Japan, $4.6 billion for the EU and $17.8 billion for the United States. China does not reveal the amount it pays on its space program, but it is estimated to be between $1.5 billion and $2 billion.

But simply ramping up spending is not good enough to ensure the modernization of the space industry. For one thing, the space agency is not known for its efficient use of funds.

Igor Lisov, an expert at Novosti Kosmonavtiki, said that while Russia is about tied with China in terms of the development of its space industry, China spends its money "more rationally."

In any event, a ramp-up in spending now will not begin to yield results for three or four years. “In the space industry, this money will not bring fast results,” Lisov said.

Satellite Sovereignty

But modernizing Russia's space industry will involve much more than simply funding cash to the Federal Space Agency. As far as the presidential commission on modernization is concerned, it will involve four things in particular: developing the Glonass navigation system, a competitor to the United States' GPS; developing a system of geographical monitoring that would allow satellites to analyze the land, air and sea from space; adapting an existing space-based defense targeting system for emergency situations; and moving to a system of satellite-based broadband.

Glonass is perhaps the highest-profile of these projects, and the government has spent more than $2 billion on the project since it began developing it in earnest a decade ago — then largely intended for military purposes.

But following the wild consumer success of GPS-based electronic devices, the emphasis behind Glonass has shifted from defense to consumer applications.

"To me, the Glonass program is a real sign that Russia is attempting to join the global marketplace with a highly desired and marketable item," said Charles Vick, senior policy analyst at Globalsecurity.org, a U.S.-based think tank.

But so far, the country has met with only mixed success in selling Glonass to Russian consumers. While 21 of the total planned 24 satellites are already in orbit, there are only 43,000 Glonass systems currently in operation, according to government figures, and most of those are used by emergency and police vehicles. A pilot program has also been started in which prisoners are issued with Glonass anklets, which allow authorities to monitor their locations.

To give the nascent Glonass system a boost and to ensure what Prime Minister Vladimir Putin has called "satellite navigation sovereignty," the government is considering introducing a 25 percent import duty on consumer navigation devices that do not use Glonass chipsets.

Big Dreams

To make its mark in space, however, Russia first needs to get a few things in order back on earth. For starters, the country still relies on the Soviet-era Baikonur Cosmodrome, located in Kazakhstan, to send its ships and satellites into space.

Instead, it hopes to start sending up civilian spacecraft from the proposed Vostochny Cosmodrome, to be located in the Amur region, with construction slated to begin in 2011.

The government will spend more than $800 million over three years on the new cosmodrome, which it hopes will start taking some of the traffic from Baikonur, which Russia pays Kazakhstan $115 million a year for usage rights.

“Russia should not rule out the continued use of the Baikonur Cosmodrome even though it intends to replace it with the other facility. Both can and should back each other up in the near term," Vick said.

Another Soviet-era space legacy that needs updating is the rockets used to send vessels into space. Currently, Russia uses the Proton rocket booster, which is reliable but is limited in the amount of payload it can carry.

The Angara rocket has been tipped as the next generation rocket, able to carry 37 percent more payload than the Proton. But its development has been a long time in the making, and shortages of funding have repeatedly pushed back its delivery date.

Originally, the Angara was to be released by 2011, but the Khrunichev Center, which is developing the rocket, said in July that tests on the rocket now would not begin until 2013. By that time, it is likely to already be out of date.

"[The Angara] has been under development for 15 years, and now it is old technology by any measure," said Marinin, of Novosti Kosmonavtiki.

But the difficulties involved in bringing such projects to fruition has not tempered officialdom's big dreams for the space sector. The Federal Space Agency has announced plans to build a nuclear-powered space ship that will fly to Mars, among other possible destinations.

The first designs for the ship, based on ideas developed by Soviet scientists in the 1960s, will be ready by 2012, and the government will spend more than $570 million over nine years on the project, much of which will go to Rosatom, which is developing the vessel's nuclear engine.

"The realization of this project will take Russian engineering to a completely new level, which in many ways will be far ahead of foreign innovations," said Perminov, of the Federal Space Agency.

Return to Science

But building a new cosmodrome just to send more foreign satellites into space will not give Russia leadership in the field of space exploration. Rather, the country should focus on expanding its own scientific interest in space, experts said.

Although it has launched many foreign scientific satellites into space, Russia has not been able to keep a single one of its own in orbit. The Koronas-Foton satellite, launched in January 2009, stopped functioning because of a battery problem in December of that year. The satellite was supposed to deliver data about the activity of the sun.

Advancing domestic space science is the key to modernization efforts, said Mikhail Pavlinsky, deputy director of the Russian Institute for Space Research.

"Building rockets, cosmodromes and developing Glonass — if we follow this path, then in 15 years, we will just be at the same place we are now," he said.

But for the time being, developing Russian space-based science means looking abroad for the material to do so.

As Russian scientific institutions began to suffer during the 1990s, astronomers began to rely on foreign-made equipment, since most domestic companies stopped producing parts, Pavlinsky said.

As an example, he cited the X-ray telescope that he and his team are assembling to launch in 2012. The crystal to be used in the telescope was purchased in Japan after a long search of producers within the country.

"It's turned out to be cheaper and better," he said.

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