Russian scientists to join round-the-world computer network ring.

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MOSCOW, January 28 (Itar-Tass) -- Russian scientists will be able to join the round-the-world computer network ring in order to exchange with their foreign colleagues information on thermonuclear fusion and the creation of a living cell in laboratory conditions.

Academician Yevgeny Velikhov, who gave a report in the official launching of the global computer network ring for advance science and education cooperation in Beijing on January 12, said, “Now nuclear physicists in Russia and other countries participating in the international thermonuclear experimental reactor (ITER) project have an opportunity to offer technical solutions for building it in two countries – France and Japan.”

In his words, ITER experts in Tokyo this week will present their conclusions regarding the use of the round-the-world computer ring in the interests of the project, which may “facilitate an appropriate political decision of the heads of nuclear agencies of the ITER countries in Vienna at the end of February.”

Velikhov said, “The newly created global computer network has nothing to do with the Internet and is built specifically for fast transmission of large volumes of scientific information.”

The network “will also be used for remote control of high-tech equipment and teleconferences.”

The academician said, “The global network links serves in Chicago with supercomputers in Amsterdam, Moscow, Siberia, Beijing and Hong Kong.”

The new network increases the bandwidth to 155 megabits per second (Mbps) between countries. In the future, “the speed of transmission may be increased sixty times,” Velikhov said.

Speaking of ITER, Velikhov said the decision on the site for the world’ s first international thermonuclear experimental reactor and the placement of orders for the manufacture of superconductors for it will have to be adopted in the beginning of 2004.

ITER member countries met in Washington in December 2003 to try to choose the place for the reactor but failed.

“The sides failed to reach a consensus in Washington but they could not twist arms” even though “all, expect for the Canadians who had officially announced their exit from the project, came to Washington to sign a document on the final expert decision on the election of the site for ITER,” he said.

Velikhov, who directed the work of Russian nuclear physicists to develop the project and create a computer version of the thermonuclear reactor, expressed hope that “the political ambitions of some of the member countries will be put on the back burner and the final decision will be adopted in the beginning of 2004.”

The academician said he was hopeful that “Canada will return to the project.”

Velikhov said, “We had a similar situation at the time when the project was being prepared,” however the work was

successfully completed in the middle of 2001. Two billion U.S. dollars have already been spent on the project. The remaining three billion U.S. dollars in the ITER budget, even without Canada's contribution of 10 percent of the total cost, "may be enough to place orders for the manufacture of equipment, construction, the creation of several computer centres to run the reactor, and the payment of wages to 400 builders and ITER personnel."

"Scientists will try to create at the experimental facility conditions similar to the processes happening in the sun, which is in fact a gigantic thermonuclear reactor," he said earlier.

"Deuterium and tritium, the reserves of which in nature are inexhaustible, will be used as fuel, and there is practically no radioactive waste from thermonuclear synthesis as there is from traditional reactors that operate at modern nuclear power plants," Velikhov said.

In order to obtain a thermonuclear reaction, a temperature of more than 100 million degrees has to be produced.

Hydrogen atoms in plasma resulting from this temperature convert to helium atoms and neutrons, releasing a great amount of energy.

"These and higher temperatures already have been obtained at experimental facilities in the Federal Nuclear Centre in Sarov," Velikhov said.

"The ITER must become the first thermonuclear reactor for production of thermal energy at the level of a commercial electric station," Velikhov said.

He cited a drafted accord on coordination and technical activities during ITER construction, the use of the fusion reactor and its decommissioning, as well as licensing terms and the construction site.

At the meeting in Washington, France proposed to build the reactor at the nuclear research centre in Cadarash. Japan offered Rokasho on the Honshu Island.

Velikhov proposed a compromise: "The reactor can be built in Japan but the thermonuclear process will be controlled from Europe."

U.S. officials assumed a "neutral position" with regard to both candidates.

Eighteen years after conception, the project to design and build an international experimental fusion reactor has turned from a "science fiction anachronism" of the post-Soviet era into a concrete object of medium-term interstate technical and financial planning and has sparkled a serious competition for the right to host it.

The almost four billion U.S. dollar ITER programme (which means "the way" in Latin) is the world's second largest research programme after the International Space Station.

In May of last year, Japan decided to build ITER on its territory. Tokyo even allocated a site in Rokkasho at the northern tip of Honshu where a big centre is being created to process radioactive materials and store used nuclear fuel.

As a founder of the project, Russia intends to participate by providing equipment and technology.

In addition to Kurchatov Institute's numerous "tokamak" and other "brand" developments, the Ioffe Physics-Technical Institute has created a spherical tokamak called Globus-M (Globe-M). It served as the basis for research in 1999 to generate and keep high-temperature plasma inside the five-tonne "globe" made of heat-resistant materials. The device, which outwardly looks like a school globe, was made by Severny Zavod aircraft plant as part of the defence conversion programme.

Russia plays a leading role in the ITER project since the reactor concept was developed by Kurchatov Institute. In 1978, the Soviet Union proposed, through the International Atomic Energy Agency, to create an international thermonuclear experimental reactor of the tokamak type -- a toroidal (doughnut-shaped) magnetic configuration in which to create and maintain the conditions for controlled fusion reactions.

Agreements on cooperation in the field of controlled fusion reactions reached between the Soviet Union and the United States in 1985, and later joined by Tokyo and the European Union in 1988, provided the basis for the ITER project. Four years later, the sides decided to begin engineer studies in order to start construction by 1998. However work was slowed down by political and financial problems.

At multilateral consultation in Paris in April 1997, the sides reached an agreement to postpone construction for three years. By that time, none of the four participating sides had given its consent to host the reactor due to huge costs. In 1999, the U.S. withdrew from the project but two years later official negotiations on the project resumed.

Specialists believe that thermonuclear reactors will usher in a new era of nuclear power engineering in the next millennium because they will practically eliminate the risk of big accidents. Any malfunction will immediately stop fusion thus preventing an uncontrolled chain reaction.

Velikhov says that it will take 10 years to built and commission the reactor. This will be followed by two five-year periods of operation.

In his view, “people should get a powerful source of energy in 20 years to use it not for the production of nuclear weapons but for the benefit of humankind”.

According to preliminary estimates, if the project succeeds, the world will get a new source of clean and safe energy in some 35 years.