

Soviets set up new plasma physics center

by Clifford Gaddy

A recent announcement that the Soviet Union has set up its first National Center for Plasma Physics Technologies may signal an important upgrading of what is already thought to be a near-crash program for the development of the directed-energy weapons systems required for a anti-missile defense of the U.S.S.R.

Plasma physics is the branch of fundamental science that underlies virtually all of the important components of laser and beam weapons applications, and the Soviets' historically strong emphasis in this area has given them—at least until recently—a significant lead over the United States in development of beam weapons. It now appears that their plasma physics and plasma engineering programs are going to be accelerated.

The new center, located in the Siberian city of Novosibirsk, was announced in a recent issue of the Soviet economic weekly, *Ekonomicheskaya Gazeta*. From now on, all phases of plasma physics research and development, from fundamental research to technology implementation, almost certainly including weapons applications, will be coordinated by the Novosibirsk center. The center has been organized on the basis of two existing bodies: the Institute of Thermal Physics of the famed Siberian branch of the Academy of Sciences of the U.S.S.R., and the Energokhimmash special-design office.

Some idea of the scope of plasma engineering under the new program can be gained from the details of the *Ekonomicheskaya Gazeta* article, even though that report not surprisingly ignores any military application of the technology. The article, entitled "100 Professions of the Plasmatron," describes some of the models, including photos, of existing Soviet plasma-generating devices, so-called plasmatrons, and their uses in the civilian economy. These models, already being produced on assembly lines in at least two major plants in Siberia, range from a "mini-plasmatron" used for light cutting tasks, to fairly high-powered devices used for plasma surface treatment of heavy-duty metal implements.

The article reveals that Siberian industries are already using plasma devices for a variety of applications, including the following:

1) Surface treatment of metals, e.g., ship propeller blades of ordinary carbon steel are given a surface as hard and corrosion-resistant as expensive alloys.

2) "Plasma furnace" devices for the destruction of toxic wastes; and "plasmatron reactors" for coal gassification.

3) Plasma chemical technologies for cheaply producing nitric acid for fertilizers, directly from air, water, and electricity.

Perhaps the most important function of the new Novosibirsk center will be in upgrading and expanding related education nationwide. According to *Ekonomicheskaya Gazeta*, several different departments at the Novosibirsk Institute of Electrical Engineering are starting specific training programs for engineers. Other universities are following suit. A special department of plasma engineering and research has been opened at Tomsk Polytechnic Institute, and Krasnoyarsk University this fall opened a design office for plasma technologies.

Renewed debate

One of the most significant points about the *Ekonomicheskaya Gazeta* article is that it is the first coverage of this subject in this publication in nearly two years. Since late 1982, it has apparently been a rigid policy not to make any reference to even the civilian applications of lasers, beams, and plasma technologies. One possible explanation for the shift in policy is that it is an attempt to place renewed emphasis on the problem of using high technology to solve critical bottlenecks in the economy. It is in the phase of introduction of new technologies into the production process, that a Soviet beam-weapons program will run into critical difficulties.

The *Ekonomicheskaya Gazeta* article concludes on the note that the establishment of the new center "is going to force us to look for new ways of combining the forces of scientists and production people so as to more quickly yield a tangible economic result."

Also evidence that the Soviet leadership is cautiously encouraging discussion of the bottleneck problem is another recent *Ekonomicheskaya Gazeta* article by the controversial economist, Viktor Krasovsky. This is the first time in well over a year that he has been allowed to write in this publication. Krasovsky has in the past taken the position that the notorious inertia of the Soviet economy can only be overcome by a radical increase in the rates of scrapping out-of-date technologies and a bold introduction of new technologies. That idea is by no means popular among Soviet economic-management strata. There is a whole school of economists who insist upon simply repairing and overhauling old equipment until it literally falls apart for good. In his *Ekonomicheskaya Gazeta* article, Krasovsky cites a major metal combine where the management has ordered one machine overhauled 38 times, at a cost far exceeding its original value.

Viewed against the background of the upgrading of the plasma technologies program, Krasovsky's reappearance may signal that the Soviets are now convinced that some substantial changes may have to be made in the Soviet economy if they are to win a beam-weapons arms race with the United States.