THE SPACE INDUSTRY IN RUSSIA

The recent (December 2005) spate of news about Russia's space program was decidedly mixed. According to Space News, the 17-country European Space Agency (ESA) declined to participate in Russia's $60 million, two-year Clipper manned and winged space vehicle program, a touted alternative to NASA's Crew Exploration Vehicle.

With an anual budget of $800 million, the Russian Federal Space Agency sought to minimize the importance of this surprising turnabout. In a press conference, Nikolay Sevastiyanov, President of the Russian aerospace contractor RSC-Energia, said: "We're starting to design this new transportation system to support the International Space Station (ISS) once it's complete." A space tug, dubbed Parom, will tow the Clipper to the ISS.

But this is not the whole truth. The Clipper - a combined crew and cargo vehicle - is at the heart of Russia's renewed attempt to land crafts on the moon and on Mars.

The Clipper is the culmination of a decade of research, development, and geopolitical maneuvering, involving many other elements.

Consider the "Volga". It is the name of a new liquid-fueled retrievable and reusable (up to 50 times) booster-rocket engine. It will be built by two Russian missile manufacturers for a consortium of French, German, and Swedish aerospace firms. ESA - the European Space Agency - intends to invest 1 billion euros over 10-15 years in this new toy. This is a negligible sum in an $80 billion a year market.

Russian rockets, such as the Soyuz U and Tsiklon, have been launching satellites to orbit for decades now and not only for the Russian defense ministry, their erstwhile exclusive client. Communications satellites, such as Gonets D1 ("Courier" or "Messenger"), and other commercial loads are gradually overtaking their military observation, navigation, and communications brethren. The Strategic Rocket Forces alone have earned more than $100 million from commercial launches between 1997-9, reports "Kommersant", the Russian business daily.

Still, many civilian satellites are not much more than stripped military bodices. Commercial operators and Rosaviakosmos (Russia's NASA) report to the newly re-established (June 2001) Russian Military Space Forces. Technology gained in collaborative efforts with the West is immediately transferred to the military.

Russia is worried by America's lead in space. The USA has 600 satellites to Russia's 100 (mostly obsolete) birds, according to space.com. The revival of US plans for an anti-missile shield and the imminent, unilateral, and inevitable American withdrawal from the Anti-Ballistic Missile Treaty add urgency to Russian scrambling to catch up.

Despite well-publicized setbacks - such as the ominous crash at Baikonur in Kazakhstan in July 1999 - Russian launchers are among the most reliable there are. Fifty-seven of 59 launch attempts were successful last year. By comparison, in 1963, only 55 out of 70 launch attempts met the same happy fate.

American aerospace multinationals closely collaborate with Rosaviakosmos. Boeing maintains a design office in Russia to monitor joint projects such as the commercial launch pad Sea Launch and the ISS. It employs hundreds of Russian professionals in and out of Russia.

There is also an emerging collaboration with the European Aeronautic Defense and Space (EADS) company as well as with Arianespace, the French group. A common launch pad is taking shape in Kourou and the Soyuz is now co-owned by Russians and Europeans through Starsem, a joint venture. Russia also intends to participate in the hitherto dormant European RLV (Reusable Launch Vehicle) project.

The EU's decision, in the 2002 Barcelona summit, to give "Galileo" the go ahead, would require close cooperation with Russia. "Galileo" is a $3 billion European equivalent of the American GPS network of satellites. It will most likely incorporate Russian technology, use Russian launch facilities, and employ Russian engineers.

This collaboration may well revive Russia's impoverished and, therefore, moribund space program with an infusion of more than $2 billion over the next decade.

But America and Europe are not the only ones queuing at Russia's doorstep.

Stratfor, the Strategic Forecasting firm, reported about a deal concluded in May 2001 between the Australian Ministry of Industry, Science and Resources and the Russian Aviation and Space Agency. Australian companies were granted exclusive rights to use the Russian Aurora rocket outside Russia. In return, Russia will gain access to the ideally located launch site at Christmas Island in the Indian Ocean. This is a direct blow to competitors such as India, South Korea, Japan, China, and Brazil.

Russian launch technology is very advanced and inexpensive, being based, as it is, on existing military R&D. It has been licensed to other space-aspiring countries. India's troubled Geosynchronous Satellite Launch Vehicle (GSLV) is based on Russian technology, reports Stratfor. Many private satellite launching firms - Australian and others - find Russian offerings commercially irresistible. Russia - unlike the US - places no restrictions on the types of load launched to space with its rockets.

Still, launch technologies are simple matters. Until 1995, Russia launched more loads annually than the rest of the world combined - despite its depleted budget (less than Brazil's). But Russia's space shuttle program, the Energia-Buran, was its last big investment in R&D. It was put to rest in 1988. Perhaps as a result, Russia failed dismally to deliver on its end of the $660 million ISS bargain with NASA. This has cost NASA well over $3 billion in re-planning.

The living quarters of the International Space Station (ISS), codenamed "Zvezda", launched two years late, failed to meet the onerous quality criteria of the Americans. It is noisy and inadequately protected against meteorites, reported "The Economist". Russia continues to supply the astronauts and has just launched from Baikonur a Progress M1-8 cargo ship with 2.4 tons of food, fuel, water, and oxygen.

The dark side of Russia's space industry is its sales of missile technology to failed and rogue states throughout the world.

Timothy McCarthy and Victor Mizin of the U.S. Center for Nonproliferation Studies wrote in the "International Herald Tribune in November 2001:

"[U.S. policy to date] leaves unsolved the key structural problem that contributes to illegal sales: over-capacity in the Russian missile and space industry and the inability or unwillingness of Moscow to do anything about it ... There is simply too much industry [in Russia] chasing too few legitimate dollars, rubles or euros. [Downsizing] and restructuring must be a major part of any initiative that seeks to stop Russian missile firms from selling 'excess production' to those who should not have them."

The official space industry has little choice but to resort to missile proliferation for its survival. The Russian domestic market is inefficient, technologically backward, and lacks venture capital. It is thus unable to foster innovation and reward innovators in the space industry. Its biggest clients - government and budget-funded agencies - rarely pay or pay late. Prices for space-related services do not reflect market realities.

According to fas.org's comprehensive survey of the Russian space industry, investment in replacement of capital assets deteriorated from 9 percent in 1998 to 0.5 percent in 1994. In the same period, costs of materials shot up 382 times, cost of hardware services went up by 172 times, while labour costs increased 82-fold. The average salary in the space industry, once a multiple of the Russian average wage, has now fallen beneath it. The resulting brain drain was crippling. More than 35 percent of all workers left - and more than half of all the experts.

Private firms are doing somewhat better, though. A Russian company unveiled, in March 2002, a reusable vehicle for space tourism. The ticket price - $100,000 for a 3-minutes trip. One hundred tickets were already sold. The mock-up was exposed to the public in a Russian air base.

As opposed to grandiosity-stricken Russia, Kazakhstan has few pretensions to being anything but a convenient launching pad. It reluctantly rents out Baikonur, its main site, to Russia for an $115 million a year. Russia pays late, reports accidents even later, and pollutes the area frequently. Baikonur is only one of a few civilian launch sites (Kapustin Yar, Plesetsk). It is supposed to be abandoned by Russia in favor of Svobodny, a new (1997) site.

Kazakhstan expressed interest in a Russian-Kazakh-Ukrainian carrier rocket, the Sodruzhestvo. It is even budgeted for in the Russian-Kazakh space program

budget 2000-2005. But both the Russians and the Ukrainians were unable to cough up the necessary funds and the project was put on indefinite hold.

Umirzak Sultangazin, the head of the Kazakh Institute for Space Research, complained bitterly in an interview he granted last year to the Russian-language "Karavan":

"Our own satellite is an dire need. So far, we are using data "received" from US and Russian satellites. Some information we use is free, but we have to pay for certain others ... We have high-class specialists but they are leaving the institute for commercial structures because they are offered several times bigger salaries. I have many times raised this question and said: Look, Russia pays us not a small amount to lease Baykonur [some 115m dollars a year], why should we not spend part of this money on space research? We could have developed the space sector and become a real space power."

Kazakhstan has its own earth profiling program administered by its own cosmonauts. It runs biological and physical experiments in orbit. The "tokhtar" is a potato developed in space and named after Kazakhstan's first astronaut, the eponymous Tokhtar Aubakirov.

Almost all the former satellites of the USSR have established their own space programs after they broke away, vowing never again to be dependent on foreign good will. Romania founded ROSA, the Romanian Space Agency in 1991. Hungary created the Hungarian Space Office.

The Baltic states - to the vocal dismay of many of their citizens - work closely with NATO on military applications of satellites within the framework of BALTNET (the Baltic air space control project). Poland (1994), Hungary (1991), Romania (1992) and the Czech Republic have been cooperating with ESA on a variety of space-related commercial and civil projects.

Ukraine hedges its bets. It signed with Brazil a space industry bilateral accord in January. A month later it signed five bilateral agreements regarding the space industry with Russia.

Many Western academic institutions, NGO's, and commercial interests created frameworks for collaboration with space scientists from Central Asia, Central and Eastern Europe, Russia, CIS, and NIS. The University of Maryland pioneered this trend with its East-West Space Science Center, formed in 1990.

The space industry - and particularly the emerging field of launch technologies - represents one of the few areas in which the former communist countries may retain a competitive edge and a relative advantage. The West would do well to encourage the commercialization of this knowledge. The alternative is proliferation of missile technologies and military applications of technology transferred within collaborative efforts on civilian projects with Western partners. The West can save itself a lot of money and heartache by being generous early on.