Chapter 23:

Russian Perspectives on Spacepower

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Achievements in space exploration and utilization are that part of its Soviet heritage that the Russian Federation views with great pride and satisfaction. In 1957, the Union of Soviet Socialist Republics (USSR) was the first nation in the history of the world to put a satellite in space, and in 1961 it followed with the first manned space flight. During the Cold War, Soviet spacepower was second to none—in some respects behind and in others ahead of that of the United States.

Since the collapse of the Soviet Union in 1991, due to a protracted economic decline and depression, Russian space potential and activities have suffered greatly. The end of the Cold War added to this decline since during the decades of arms race and confrontation, Soviet space activities had been closely associated with military purposes and requirements. (In fact, the first Sputnik was a byproduct of the development of intercontinental ballistic missiles [ICBMs], which were needed to negate U.S. strategic nuclear superiority stemming from its geographic remoteness and forward-based aircraft and missile deployments in Europe and Asia.)

After 1991, the sharp decline of the defense and space budgets and disintegration of scientific centers and industrial cooperation, exacerbated by the loss of assets of other former Soviet republics that were newly independent (the foremost being Ukraine, Belarus, Kazakhstan, and Tajikistan), led to a virtual collapse of Soviet spacepower. The only exception was the commercial space launching program, which largely utilized Soviet/Russian converted ICBMs retired from service (such as START–1, Dnepr, Zenit, and Rokot). This program provided at least some revenue that saved Russian spacepower from total demise during the 1990s.

Nonetheless, by the beginning of the current decade, Russian space activities were badly undercut. Overall Russian space assets decreased 150 percent during the 1990s and in 2004 consisted of 96 satellites (70 percent military and dual-purpose), of which 65 percent were beyond service lifetime (33 military and 29 civilian and dual-purpose). The American space constellation consisted of 415 military and civilian satellites. The U.S. space budget ($16.4 billion) was 20 times bigger than Russia's ($0.8 billion). In contrast to the 12 or 13 U.S. radioelectronic and electronic-optical reconnaissance satellites, Russia had only 1 in orbit at any given time.[1]

Obsolete naval communication satellites Molniya-1T, Molniya-3, and Parus could not be replaced by the new Meridian-type craft due to shortage of funding. Out of eight needed missile attack early warning satellites (71X6 and 73D6), only three were in orbit. The Russian global navigation satellite system (GLONASS) consisted of only 14 instead of

24 satellites, which were not enough even for the permanent coverage of Russian territory. Hence, Russian combat aircraft, including strategic bombers, had to rely on the U.S. analogous global positioning (NAVSTAR) space system. Likewise, the Russian Northern Fleet had to receive ice condition information from Canadian Radarsat-1 spacecraft.[2]

During the last several years, Russian spacepower has been gradually recovering from the crisis. Presently there are 99 Russian satellites in space (70 percent military and dual-purpose). New vintage satellites were placed in orbit (Meridian, new type early warning, communication, and reconnaissance systems), and the number of GLONASS satellites was increased to 17. New space launchers are under intensive development (Angara, START–1, Soyuz 2–1B). The Plesetsk space and missile launching range is undergoing broad modernization (for Angara and Soyuz 2–1B vehicles). With the Angara launcher, Plesetsk for the first time will be able to reach geostationary orbit and loft superheavy loads in space. Space Forces (a separate branch of the armed services) is withdrawing from Baykonur range (in Kazakhstan) and curtailing its assets at Svobodniy range (in the Far East) to a minimal scale. The personnel level presently is 50,000 military and 25,000 civilians and is not being reduced any further. [3]

Altogether, Russia (by joint efforts of Space Forces and Roskosmos) is conducting about 25 space launches annually for its own needs. A new space command and control site was commissioned in Armavir to make up for the two sites left in Ukraine (Yevpatoria and Dunayevtzy). Missile early warning radars of the Missile-Space Defense (part of Space Forces) were modernized in Pechora, Irkutsk, Balkhash (Kazakhstan), and Lekhtusi (Belarus). A new rapid-deployment radar system was tested successfully near Saint Petersburg. In addition to the electro-optical space monitoring station in Nurek (Tajikistan), a new site was commissioned in Karachaevo-Cherkessia (North Caucasus).[4]

The Federal Space Program

The Russian government sees spacepower as one of the most important attributes of authority and prestige of a nation in the world today. In fact, Moscow believes that a country cannot claim the status of great power without developed space assets and activities—both civilian and military. Space systems are interpreted in Russia as orbital groups of spacecraft and land-based command-control and information relay sites, as well as space launch ranges, launchers, and support infrastructure. In the course of the few last decades, those systems and facilities have become the most important—in some cases, the crucial—resource in supporting military, socioeconomic, commercial, and scientific activities of the world.

The Federal Space Program approved in November 2005 envisions $12 billion in outlays until 2015. The program and other official directives postulate the following goals of Russian space activities:

- expanding the commercial, economic, scientific, and defense usage of outer space
- expanding international cooperation in the civilian exploitation of space

- ensuring Russian access to outer space
- preserving the Russian position at the cutting edge of space technological development.

In order to achieve these goals, Russia must fulfill the following tasks:

- maintenance and development of a modern and effective space constellation
- deployment and exploitation of the Russian segment of the International Space Station (ISS) consisting of 5 modules (presently Russia is mostly engaged in transportation)
- providing of Russian contribution in the COSPAS-SARSAT system (2 satellites)
- development of advanced variable mission space launchers (Angara) and modernization of the existing ones (Proton, Soyuz-2)
- maintenance of the civilian space range at Baykonur and civilian-military range at Plesetsk
- improvement of the quality of satellites (extending maximum service lifetime from 2 years to 10–12 years)
- reforming space industries (presently consisting of 112 enterprises and 250,000 employees to be concentrated in 3 or 4 holdings)
- further increasing Russia's share in the world commercial space launch market (presently 40 percent, compared to 30 percent for the United States, 16 percent for China, 6 percent for the European Union, and 2 percent for India).

International Cooperation

Russia is heavily dependent on international cooperation in space exploration and exploitation, both as a donor and as a recipient, as well as a delivery service manager. Presently approximately 180 countries participate in space activities in some way. At least 40 of these are associated with the use of outer space information and support for military systems and forces, and 19 nations have scientific and industrial potential for manufacturing their own spacecraft. In various orbits, there are currently more than 700 space satellites of civilian, military, and dual purpose types, among those about 400 American and 100 Russian, including the International Space Station.

By the level of budget allocation, Russia is lagging far behind the leading spacefaring nations. The United States is firmly in first place, followed by the European Union (through the European Space Agency [ESA]), Japan, China, Russia, and then India. At the same time, the space plans and ambitions of Russia, and its remaining scientific-industrial potential and infrastructure, are much greater than its current budgets would imply.

Hence, Russia has a major interest in expanding its role in international space cooperation. Furthermore, Russia's role in world trade is much too dependent on its export of raw natural resources, which is characteristic of developing countries. Besides trade in arms and nuclear materials and technologies, cooperation in space activities is one of very few high-technology export items that Russia can pursue in the near- to mid-

term future. That is why this trade channel is so important to Russia both from the angle of status and prestige and in view of the revenues it brings to its underfunded space programs and assets.

For Russia, the most valuable international projects are the following:

- the International Space Station, with the United States and many other foreign states (Canada, Japan, and 17 member-states of the ESA)
- COSPAS-SARSAT
- a big unfolding space antenna (Roskosmos and Energiya with ESA and Italy)
- microsatellites (150 kilograms) for Earth sounding (Roskosmos with EADS-Astrium)
- advanced Manned Transportation System (based on modernized Soyuz launch vehicle for orbital and Moon flights)
- cooperation with ESA and France on the launching complex for Soyuz 2–1T from Kourou space range in French Guiana
- cooperation with ESA and India on new space navigation systems
- long-term international projects of flights to Mars and Venus.[5]

Russia's attitude to recipient nonspace nations in the Middle East, East-South Asia, and Latin America is motivated by commercial and political interests. Moscow's cooperation with spacefaring nations is a combination of the donor-recipient model. The main partners are ESA (foremost France, Italy, and Germany), the United States, Japan, China, India, Ukraine, Belarus, Kazakhstan, and Brazil.

In addition, Russian willingness to provide launch and satellite services to some states is motivated by its interests, which initially shaped its 1999–2000 proposals on the global system of control over missile and missile technology nonproliferation. That initiative was formally introduced at the 2000 Non-Proliferation Treaty review conference and envisioned provision of space services to states refraining from developing their own missile capabilities and abiding by the Missile Technology Control Regime.[6]

Military Space Requirements

Russia's military space requirements and programs are different from those of the United States. Having very limited, if any, conventional long-range power-projection capability (or long-range precision-guided weapons), Russia does not heavily rely on space systems for its conventional operations. Only reconnaissance and communications systems are of some value. In contrast to the USSR, Russia's faraway naval deployments are not conducted on a permanent basis, except when on infrequent naval exercises.

As for strategic forces, Russia deploys only 1 or 2 ballistic missile submarines at sea at any given time, and its heavy and middle-range bombers fly only during rare exercises. These would surely benefit from better space communication and navigation capabilities, but those capabilities are not crucial.

However, Russia's dependence on missile early warning satellites is truly decisive. Due to financial problems and mistaken decisions on a strategic modernization program in 2000–2001, Russian strategic forces are becoming more vulnerable. Russia's ever smaller number of submarines and bombers is not survivable in bases and on airfields. Its mobile missile force is shrinking because many more obsolete SS–25 ICBMs are withdrawn than new SS–27s are deployed. Its silo-based ICBMs (including new SS–27s) and fewer mobile SS–27s in shelters increasingly depend on launch-on-warning (LOW) to maintain deterrent capability. On top of all this, out of eight big missile early-warning radars, five are deployed outside of Russian territory (in Belarus, Ukraine, Azerbaijan, and Kazakhstan) and cannot be relied upon in time of a hypothetical crisis involving a strategic nuclear threat.

Russian official and unofficial attempts from 2001 to 2005 to come to an agreement with the United States to cut strategic forces to lower than 1,700 to 2,200 warhead levels (Moscow 2002 Strategic Offensive Reduction Treaty) to reduce U.S. counterforce capability, or to jointly lower the readiness for launch status of strategic forces (for the same purpose), proved to be futile.

Hence, Russia has a heavy and growing reliance on the LOW concept and early warning satellites. The fact that this system does not have a much higher priority in Russia's space and defense program reflects Moscow's relaxed attitude toward the probability of a confrontation with the United States and its allies and a huge lack of coordination in Moscow's strategic forces, programs, posture, and support systems. Nonetheless, it is not an acceptable justification: strategic posture is such an important element of national security that internal contradictions are not to be looked at with complacency. Development and deployment of space weapons, particularly those of antisatellite class, would greatly exacerbate this instability against the background of the U.S., Russian, and potentially Chinese strategic postures.

All in all, it may be stated flatly that Russia has great interests and ambitions in outer space, both civilian and military, but those interests are confined to unarmed craft. This position stems from both Russia's overwhelming dependence on international cooperation in outer space and the severe shortage of funding for defense in general and military space programs in particular.

Hence, Russia has an extremely negative view of development and deployment of space weapons of any kind (deployed in space or designed for attacking space objects). In contrast to the USSR, which was the first nation to deploy operational ballistic missile defense (BMD) and antisatellite (ASAT) systems in the 1970s, Russia has neither the resources nor the perceived strategic requirements for pursuing space weapons. Russia would see any such development and deployment as a major provocation and a threat to its security and national interests. Moreover, Russia's future attitude toward other states and their treatment as partners or opponents will be heavily affected by their posture with respect to space weapons. In this sense, new U.S. Air Force space doctrine and various Pentagon statements on the subject are universally seen in Russia with great concern and hostility.

Only some major provocation might change Russia's policy on the issue. One is a potential U.S. deployment of space-based ASAT systems, threatening Russian early-warning satellites (which are deployed not only at geosynchronous orbits but also partly at Molniya-type highly elliptical orbits and pass at low altitude over the south polar zone). As a system for retaliation or for a direct attack on U.S. space-based ASAT craft, Russia might contemplate reviving its direct ascent ASAT systems or resuming its land-based laser program with inherent antisatellite potential.

Another trigger may be a massive U.S. deployment of space-based BMD intercept or support systems, which would threaten Russia's strategic nuclear deterrent capability. Undoubtedly, Moscow's first choice in both cases would be an asymmetric response: enhancing satellite survivability, reducing reliance on LOW, or developing BMD penetration systems. However, if that would not be enough or turn out to be too expensive, Russia may eventually go for space weapons of its own.

ASAT Systems

Apart from routine commercial competition and disputes around places in geostationary orbit and radio communication frequencies, the real conflicts in space may stem from attacks on or interference with another state's spacecraft.

In many cases, some violation of the standard operation of an individual space system may result in almost-total failure of the normal functioning of military, commercial, and other systems and structures. The hypothetical deployment of the means of destruction or interference of various physical natures, threatening spacecraft operations (foremost, that of early warning satellites) may in a crisis situation lead to a high level of strategic instability, encouraging reliance on a preemptive nuclear strike.

At the same time, a significant escalation in the number of some types of reconnaissance satellites could undercut the survivability of certain strategic forces (primarily ground-mobile missiles and missile submarines at sea) and devalue their deterrent capability, thus putting a premium on a first disarming strike or launch-on-warning—thus also leading to dangerous strategic destabilization. Both such satellites and orbital antisatellite systems provide a high incentive for the development of antisatellite weapons of various basing modes. Such is one of the most significant facets of the dialectics of strategic space systems interaction.

Apart from a number of research and development projects of the United States and the Soviet Union in the 1950s and early 1960s, the first ASAT system was developed and deployed by the Soviet Union. It was a co-orbital satellite-killing vehicle guided by radar and infrared sensors developed in the Kometa design bureau. The launcher was a modified SS–9 (RS–36) and SS–18 (RS–36M) heavy ICBM system. The first test in space was conducted in 1968, and tests continued until 1982. Several launchers were deployed at Tyuratam (Baykonur) space range in 1979. The Soviet ASAT was capable of intercepting satellites at altitudes of up to 1,000 kilometers, but it was a slow action system with dubious effectiveness. When the United States responded with its own

ASAT system based on the F–15, Moscow changed its position and came forward with the proposal of a bilateral moratorium on ASAT testing, which was turned into a unilateral moratorium in 1983, observed by the USSR/Russia since then.

There is some evidence that Russia experimented with a direct-access ASAT system similar to the American one and based on the MiG–31 fighter-interceptor, and prepared to deploy some direct-access SS–19 (Ur-100UTTX)–based ASAT systems at Svobodniy test range. But neither was ever tested or deployed. The Soviet first-generation A–35 Moscow BMD system, deployed in the 1970s, had some collateral ASAT capabilities, as does the follow-on A–135 system presently deployed. However, both rely on nuclear intercept; hence, their effect would be suicidal for Russia's own satellites.

The history of negotiations on space (including antisatellite weapons) in the 1980s proved the great difficulty of creating treaty-based limitations on space systems. Currently, for a number of reasons, the political and international law environment (foremost, a collapse of the 1972 ABM Treaty after U.S. withdrawal in 2002) for such negotiations and agreements is even less favorable, despite the end of the Cold War 15 years ago. In fact, the U.S. Ground Based Interceptor (GBI)–type BMD system under deployment is already an effective ASAT system for destroying satellites at up to 1,500 kilometers altitude. The only thing missing is a global deployment to provide for fast interception at various orbits and testing against a target satellite.

Defining Space Weapons

Besides political and strategic obstacles to effective negotiations on space weapons, there are legal problems with the definitions of such systems. It seems that the preferable definition is as follows: *space weapons* are means of destruction and disruption of functioning of space objects, specifically developed and tested for this purpose in any basing mode; and means of destruction of any target of any location, if such means are developed and tested for deployment at Earth orbits (that is, designed to perform at least one revolution around the Earth). Hence, space weapons are distinguished either by their designated targets (space objects) or by their own basing mode (at Earth orbit).

A simpler and less strict definition of space weapons could be a weapons system (means of destruction) that is a space object or is designed to destroy space objects. However, many types of weapons or destruction systems have multiple uses, and their development, testing, and deployment cannot be directly limited by international treaties. These types include, for example, laser, kinetic, electromagnetic, particle beams, and other weapons of similar type (except nuclear weapons, which are prohibited from being deployed in space, albeit without verification procedures, by the 1967 Outer Space Treaty and from being tested by the 1963 Partial Test Ban Treaty).

Many systems, intended for other missions—offensive ballistic missiles of various types if fused for space burst, fractionally orbital bombardment systems, maneuverable satellites, and manned spacecraft—may have collateral capabilities to destroy space objects.

Of particular importance are strategic antiballistic missile systems of any type of deployment (basing mode) that have implicit antisatellite potential, especially against low- and medium-altitude (up to 1,500 kilometers) satellites. It might be possible to only impose a ban on testing strategic antimissile systems against space objects, somewhat limiting their combat effectiveness in this role. Such limitation would be ineffective against nuclear antimissile interceptors, although the United States does not develop or deploy such systems, while Russia has a limited number around Moscow with low-altitude range. U.S. interceptors of GBI type designed to hit missiles at mid-course multiple independently targetable reentry vehicle–dispensing phase would be theoretically able to use the same guidance systems against satellites at low- to mid-altitude orbits. Still, some dedicated tests against satellites would probably be needed to be sure of their effectiveness for such missions.

To bolster responsibilities of spacefaring nations and to formalize the bounds of those responsibilities, it might be possible as a first step to develop and voluntarily accept a code of conduct in space activities (CoCSA). Its goal would be to ban activities aimed at destroying or interfering with the functioning of space systems, as well as constraining development, deployment, and use of weapons systems intended for such actions.

This kind of ban would naturally operate under peacetime conditions, but it may lower the technological and operational capabilities of states for destabilizing actions (and consequently for triggering uncontrolled escalation) under conditions of crisis or even armed conflict. Some of its regulations could be adhered to even in times of war (in a manner similar to the non-use of chemical weapons in World War II). The CoCSA would have to impose a ban on testing, development, and employment of all means of destruction of space objects, on means of disrupting their functioning, as well as of all weapons (means for destroying targets) of space-basing mode (that is, deployed on Earth orbits). As a code, it would not need a refined verification system, counting rules, or limitation definitions. Its effectiveness would be mostly political as an agreement on intent, but it still would have a marginal utility (like The Hague Code of Conduct with respect to missile nonproliferation).

In the longer term, under favorable political and strategic circumstances, the CoCSA could become important as a basis for legally binding agreements, which would capitalize on its most important and practical points and depend on availability of tangible definitions and verification capabilities.

Notes

1. V. Miasnikov, *Nezavisimoe Voennoe Obozrenie,* December 18, 2005.
2. Ibid.
3. I. Marinin, *Space News*, April 3, 2007.
4. Interview of Space Forces Commander V. Popovkin, *Space News*, April 3, 2007.
5. Briefing, A. Perminov, September 12, 2006, accessed at <www.oborona.ru.13.09.2006>.

6. A. Pikaev, "A Global Control System: Too Comprehensive?" available at <www.ceip.org/files/Publications/Pikaev.2001>.