Space Security in Russia

20

Christophe Venet

Contents

Abstract

The post-Soviet Russia is no longer a military space superpower and strives to adjust its military space policies to a new geopolitical environment. Since the "lost decade" of the 1990s, when Russia failed to maintain many of its military space capabilities, the country has sought to rebuild its military space power. Driven by political considerations, such as the need to regain its status as a respected global power, as well as pragmatic reasons, epitomized by an increased reliance on space assets in modern warfare, Russia launched in the 2000s ambitious military space initiatives. It strengthened its foundations by reorganizing its space industry, as well as its military institutional architecture for space and its ground infrastructure.

C. Venet
French Institute of International Relations, Paris, France
e-mail: christophe_venet@hotmail.com

K.-U. Schrogl et al. (eds.), *Handbook of Space Security*,
DOI 10.1007/978-1-4614-2029-3_12,

20.1 Introduction

The Soviet Union was a pioneer in space and led, together with the USA, the space game for several decades. This heritage is both an asset and a burden for Russia's current space policy. On the one hand, Russia is still benefiting from the capabilities acquired during Soviet time, particularly in the crucial field of launchers. On the other hand, the hypertrophied and inefficient space industrial complex was severely harmed after the collapse of the Soviet Union, and in the 1990s, Russia's presence on the space scene sharply decreased. The subsequent efforts to rebuild a coherent and credible Russian space policy since the early 2000s also suffered from inherited weaknesses.

More generally, Russia is facing a structural dilemma: opting for the safe option by capitalizing on existing programs which were often developed in the Soviet era, or launching new projects from scratch, a more risky but also more promising endeavor. This dilemma illustrates the governing principles of Russia's space security policies today. On the one hand, there is a firm political will to implement a radical change of course to leave the Soviet heritage behind. On the other hand, there are clear elements of continuity between the Soviet and Russian space security policies.

While the Soviet Union was a military superpower in space, Russia's current positioning in the military space hierarchy seems more ambiguous. As a consequence of the "lost decade" in the 1990s, it clearly lags behind the USA quantitatively and qualitatively, (Facon and Sourbès-Verger 2007a, pp 37–38) and it does not seem to be capable and willing to close the gap in the near future. At the same time, however, Russia still has unique capabilities in certain areas (e.g., early warning satellites), and it is in the course of rebuilding its GLONASS satellite navigation constellation.

To understand Russia's current space security policies, it is necessary to put the issue in a broader political perspective. Not only is the Soviet legacy relevant in that respect, but so are the ups and downs of Russia's internal and external situation after 1991. The Russian space sector suffered extensively from the political turmoil in the 1990s (Arbatov 2011), but space was elevated as a symbol of the country's comeback on the international scene in the 2000s and later as an important tool for Russia's economic and industrial modernization (Facon and Sourbès-Verger 2007b). However, as one of the experts on Russia stated, "Russia's future, in essence, remains a paradox, a tension between an increasingly ambitious drive to restore Russia's standing in the world and the reality of structural weaknesses that ineluctably diminishes its ability to do so" (Roi 2010). This statement perfectly fits the military space sector.

Russia gradually started to rebuild its military space power in the 2000s. This paper explores the various aspects of this transformation. It first sketches the overall political context in which to consider Russia's space security policies, showing that military space regained, in recent years, its strategic status. It then focuses on the foundations of Russia's military space power, which are necessary to support Russia's space security policies. Indeed, Russia reshuffled its military space institutional architecture, reorganized its space industry, and modernized its ground

infrastructure. Finally, Russia's policies in various fields of space security are analyzed. This paper adopts the classical distinction between space militarization (or space for security, the use of space assets to support military actions on Earth, which is already taking place) and space weaponization (or security for space, the potential conflict in space using space weapons, which is still hypothetical). While both aspects will be considered separately for the purpose of the analysis, it is important to remember that space militarization and space weaponization are functionally linked, as military space activities should be considered on a single threat continuum.[1] As for the former, Russia adopted a rather pragmatic approach in a clear shift from Soviet policies. As for the latter, Russia's positions are still largely influenced by the US strategic posture, a sign of some continuity with the Soviet era.

20.2 Political Context

The state of the Russian space sector, and more particularly of its military branch, has been closely linked to Russia's political fate in the last 20 years. After a near collapse in the 1990s, Russia's space capabilities were expected to become a central element of Russia's renewed ambitions in the 2000s.

After the end of the Soviet Union in 1991, Russia went through turbulent times, both internally and on the international scene. At home, the country was plagued by political instability, by ethnic conflicts in the North Caucasus, and by the consequences of the harsh transition from central planning to a market economy. The Russian GDP diminished sharply between 1991 and 1996, and the 1998 financial crisis had a strong negative impact on the country (International Monetary Fund). At the international level, Russia lost the status of a superpower to become a "weak and inward-looking nation" (Tsygankov 2011) in the 1990s. One of the main pillars of its foreign policy throughout this decade was an attempt "to integrate into, and then with, the West" (Trenin 2009).

In the 1990s, Russia's space policies and capabilities reflected these trends, manifested by the loss of political interest for space matters during the Yeltsin presidency (Facon and Sourbès-Verger 2007b). Overall, Russian space assets decreased considerably during the decade, and in 2004 the US space budget was 20 times larger than that of Russia (Arbatov 2011). On the military side, Russia virtually lost all of its capabilities in space, following the sharp decline of defense and space budgets, the dismantling of scientific centers, and the stopping of any sort of industrial cooperation. In the beginning of the 2000s, Russia only had a few outdated military spacecraft in orbit and its early warning, navigation and communication constellations were incomplete (Arbatov 2011, pp. 441–442). Russia's space power was only saved by the commercialization of its launchers, mainly through joint ventures with the West (Facon and Sourbès-Verger 2007a, p. 8). This dependency on the West also extended to the purely military realm, as Russian

[1] On these aspects, see DeBlois et al. (2004), Mueller (2002)

combat aircraft had to rely on the US satellite navigation system, and the Russian Northern Fleet was getting data from the Canadian Radarsat-1 satellite (Arbatov 2011, p. 442). More fundamentally, Russia lost its ability to conduct long-term research and development (R&D) activities in military space after the collapse of the Soviet Union (Podvig 2004).

In the 2000s, however, Russia's overall economic situation improved sharply, with a yearly growth rate of around 7 % starting in 2003. Although the crisis strongly hit the country, leading to a negative growth rate of −8.7 % in 2009, the Russian economy quickly recovered in 2010 and 2011 (de Montluc 2010). On the international scene, Russia entered a phase of power affirmation, with a noticeable hardening of its foreign policy (de Montluc 2010, p. 16). Putin's ambition was for Russia to behave like an independent great power (Trenin 2009; Tsygankov 2011). At the domestic level, the return of the state became the dominant motto, in both the political and economic spheres. In particular, a new industrial strategy articulated in 2005 identified key sectors in which the state should heavily intervene, including the aerospace industry (de Montluc 2010).

These economic and political trends also impacted the space sector. Since 2001, Russian political authorities started again to place an emphasis on space as a strategic sector (de Montluc 2010, p. 19). Space was to play a central contributing role in Putin's political project of Russia's rebirth as a great power (Facon and Sourbès-Verger 2007a, p. 11). Space was now conceived as a tool for prestige, in the classical Soviet understanding, but also as a means to boost Russia in the postmodern era. The space industry, as a provider of highly innovative technologies, was to become one of the drivers of Russia's economic modernization course (de Montluc 2010, pp. 15–24). This approach demonstrates a pragmatic turn in the Russian space policy: the development of space assets is a symbol of power, but it should also be done in a rational and utilitarian perspective, taking into account the existing resources (Facon and Sourbès-Verger 2007a, p. 8). To implement these ambitious objectives, Russia issued three major space policy documents in the 2000s: the specific *Federal Program on Global Navigation Systems (GLONASS) for 2002–2011* and *Federal Special Program for the Development of Russia's Cosmodromes (DRC) for 2006–2015*, and the more general *Federal Space Program (FSP)*. The latter was approved in 2005 and is running through 2015, laying down Russia's broad objectives in space, including in the security field (Government of the Russian Federation 2005). These stated ambitions were accompanied by a steady and sharp increase in the Russian space budget de Montluc (2010) Even at the peak of the crisis, in 2008–2009, the space budget continued to rise significantly (Venet 2011).

With this perspective, military space became a priority again under Putin (Facon and Sourbès-Verger 2007a, p. 25). The major objective was to rebuild military space capabilities after years of steady decline (Facon and Sourbès-Verger 2007b, p. 54). By doing so, Russia sought strategic autonomy, in particular by reducing its dependency on the West, both technologically and in terms of access to military-relevant data. The renewed focus on military space also corresponds to Russia's political ambitions on the world stage. In the classical symbolic perspective,

military space capabilities are perceived by Russian leaders as an indispensable element of a great power's portfolio. Beyond the official discourse, however, Russia's approach to military space activities is not simply power based but also pragmatic. Military space assets should not only support modern warfare but also offer technological and commercial perspectives by fully integrating the dual-use nature of space. Similarly, Russia's space security should be guaranteed but through diplomatic activity rather than an arms race.

Overall, military space regained in the 1990s, at least in the official discourse, a strategic and symbolic value it had enjoyed during the Soviet era. At the same time, a more utilitarian influx was given to space policy, as reflected in the FSP. Despite the stated ambitions, however, some uncertainty is still floating over the future of military space in Russia, given "the relative modesty of Russia's economic potential, its dependency on raw material and its technological backwardness" (Trenin 2009).

20.3 The Foundations of Russia's Space Security

As a consequence of the renewed strategic and political relevance of military space, Russia put a strong emphasis on rebuilding solid foundations to support its space security policies. Specifically, it launched a broad reorganization of its space industry, it streamlined its military space institutional architecture, and it rationalized and modernized its ground infrastructure.

20.3.1 Industrial Architecture

In line with the overall policy of heavy state involvement in strategic sectors of the Russian economy, a restructuring of the Russian space industry was launched in the 2000s. Given the strong ties between the space and defense industrial complexes, this process will have strong implications for the military space sector.

The main objectives of the process were to enhance the industry's competitiveness on global markets by reducing overcapacities and rationalizing management procedures. The *Federal Program on Reform and Development of the Military-Industrial Complex* was adopted in October 2001, and the *Strategy for the Development of the Space Industry* was approved by the Russian government in July 2006 (Nardon and Kastoueva-Jean 2007). The goal of this process is to reduce the number of industrial entities by creating a dozen of integrated state-owned companies. The underlying rationale is that supply chains would be optimized and competition for each product group would be reduced (Makarov and Payson 2009). This increased involvement of the state also had consequences for military space. After having focused on the export market for a decade, the Russian space and defense industries were invited by the government to reorient their production towards national armed forces. Similarly, both sectors were subordinated to the newly created Military-Industrial Commission (*Voenno-promychlennaïa komissiia*

or VPK) in 2006 (Facon and Sourbès-Verger 2007b). Overall, these efforts brought mixed results, and a series of recent spectacular failures – including the loss of two military satellites (the geodesy satellite *Geo-IK* in February 2011 and the dual-use communications satellite *Meridian* in December 2011) – led then-President Medvedev to call for another batch of radical reforms in the space sector (Quénelle 2012).

20.3.2 Institutional Architecture

The institutional architecture of the military space sector in Russia was likewise affected by the political evolution of the country in the last 20 years. In the 1990s, the Russian Space Forces underwent a series of reforms and counterreforms, mirroring the conflicting views on the new international environment within the Russian armed forces. In the 2000s, the institutional setup was streamlined and centralized and marked the return of the state in military space affairs.

The military space forces (*Voenno-kosmicheskie Voiska* or VKS) were created in 1992, based on the previous Soviet architecture for military space. In 1997, the VKS were merged with the strategic missile forces (*Raketnye Voiska Strategicheskogo Naznacheniia* or RVSN) and the space and missile defense forces (*Voiska Raketno-kosmicheskoj Oborony* or VRKO). This reflected the internal tensions between those seeking a strategic parity with the USA and those focusing on reforming the conventional forces. The fusion of the three bodies translated the views of the former, as it was supposed to increase the credibility of Russia's nuclear deterrence. However, the lack of a common organizational culture between the three branches and the increasingly important role played by space assets in support of Russia's armed forces led in 2001 to the recreation of autonomous space forces (*Kosmicheskie Voiska* or KV). The KV were in charge of the military spaceports (Plesetsk and Svobodny), the ground control centers, the ground radar sites, and the A-135 antiballistic missile system protecting Moscow (Facon and Sourbès-Verger 2007a, pp. 27–30). In December 2011, the KV were replaced by the newly created Aerospace Defence Forces (*Voiska Vozdushno-kosmicheskoj Oborony* or VVKO), which now encompass a wide range of functions. The VVKO's responsibilities are to detect ballistic missile launches, to intercept ballistic missile warheads, to monitor space objects and identify threats in and from space, to carry out spacecraft launches, and to maintain military satellites and their launch infrastructure in order (Ministry of Defence of the Russian Federation). The VVKO have four main components: the Russian Space Command, the Air and Missile Defence Command, the Plesetsk Cosmodrome, and the arsenal (Ministry of Defence of the Russian Federation). This additional reorganization was guided by "the necessity of a unified command and force, capable of operating in air and space combat trials, as nowadays, the race to attain strategic advantages in space became a prerequisite to ensure national security and interest in military, economic or social spheres" (Ministry of Defence of the Russian Federation). This shows that military space definitely regained its strategic status in Russia.

20.3.3 Ground Infrastructure

Efficient ground infrastructure is one of the most essential enablers of military space power. This concerns both the cosmodromes and the satellite control and space surveillance networks. Russia is seeking to modernize and rationalize these assets, driven by the need to ensure strategic autonomy to its military space forces. Indeed, after the collapse of the Soviet Union, many ground-based assets were located outside the territory of Russia, in former Soviet republics. As a result, a major driver of Russian military space policy in the past two decades was to reduce and mitigate these strategic dependencies.

20.3.3.1 Launch Infrastructure

In the beginning of the 1990s, Russia's major cosmodrome was Baikonur, in Kazakhstan. The launch center was operated by the Russian Military Space Forces, and the site was used both to launch military spacecraft and to test ballistic missiles. An agreement was concluded between Russia and Kazakhstan in 2004 to extend the Russian lease until 2050, including for military purposes (Podvig and Zhang 2008, p. 16). However, Russia's concerns over its strategic dependency on an asset based in a foreign country were reinforced in recent years by a series of tensions between Russia and Kazakhstan. In particular, disputes over drop zones of rocket stages over Kazakh territory led to several launch delays (de Selding 2012).

As a consequence, Russia launched an effort to move all its military space activities back on Russian territory. As a first step, the Russian military space forces progressively handed over all the facilities and activities of the Baikonur Cosmodrome to the civilian Federal Space Agency, Roskosmos (Oberg 2011). Furthermore, Russia reinforced the military role of the other cosmodromes located on its territory. The Plesetsk Cosmodrome in Northern Russia is undergoing significant infrastructure enhancement to become Russia's major military spaceport. The site's location, at 63° north and 41° east, is imposing much stricter constraints than Baikonur in terms of accessible orbits and maximum payload weights (Podvig and Zhang 2008, p. 18). To remedy this deficiency, a new launch pad is being constructed in Plesetsk to launch the future generation Angara rocket. This combination will enable to launch military payloads into all operational orbits (Oberg 2011). In addition to the modernization of Plesetsk, the Russian Space Forces requested in 1992 a new space launch site to be developed on Russian territory. The rationale for this demand remained the same: considering the uncertain political and economic future of Baikonur, Russia should ensure an independent access to space. The site of Svobodny in Siberia, a former strategic missile base, was initially chosen. However, due to the lack of funding, the construction of the Svobodny Cosmodrome was abandoned in 2006–2007. Despite this decision, the strategic necessity to have a spaceport on Russian territory enabling launch performances similar to those of Baikonur remained valid. For this reason, the Russian government decided in 2007 to develop a new launch site in the Amur region, called Vostochny. The new cosmodrome, which will also support military launches, is to be operational by 2020 (Russian Space Web 2012a).

It has to be noted that the issue of strategic autonomy also applies to the launch vehicles. At least two of the rockets used by the Russian military to orbit their payloads are built in Ukraine (the Tsyklon and Zenit launchers). Together with environmental concerns linked to the use of toxic propellant for the Kosmos-3M and Rockot launchers (Russian Space Web 2012b), this latent dependency led to the development of a new launcher, developed and built in Russia, the Angara rocket. The new rocket will feature a modular design, able to orbit a wide range of payloads (2–23 t in low Earth orbit or LEO), including military spacecraft (Russian Space Web 2012c).

20.3.3.2 Satellite Control and Space Surveillance

The Soviet Union built an extensive network of ground control facilities, receiving stations, and satellite tracking facilities. After the breakup of the Soviet Union, Russia lost control of some of its control and measurement complexes (*Otdelni Komando-izmeritelnii Komplex* or OKIK), as three of them were located in Ukraine, one in Kazakhstan, and one in Uzbekistan. The latter one was the newest addition to the network and included laser measurement systems. Russia still has ten operational stations scattered on its territory. Most of these OKIKs are managed by the central control unit of the VVKO, the Main Space Systems Center (*Glavnii Ispitatelnii Tsentr Ispitanii i Upravleniya Kosmicheskimi Sredstvami* or GITsIU KS), located in Krasnoznamensk, near Moscow. These stations are used to control and receive data from both civilian and military spacecraft. In addition to these dual-use facilities, some military systems are managed completely separately, such as the early warning satellites which have their own control center in Kurilovo, and the US-PU naval intelligence spacecraft managed directly by the Russian navy (Podvig and Zhang 2008, p. 21).

The Russian space surveillance and tracking system is a crucial part of Russia's military space policy. It is an integral component of Russia's early warning system, and it provides space surveillance capabilities to Russia that are second only to those of the USA. However, the network was affected by the collapse of the Soviet Union, as many radar stations that were part of the network are now located outside of Russia's territory. This is also true for two of the most modern radar stations (*Daryal* radar) built in Azerbaijan and in Belarus. As a result, Russia had to rely on older radars, some of which were built in the 1970s, and to negotiate the use of radars located outside Russia with the host countries (Azerbaijan, Belarus, Kazakhstan, Ukraine) in the beginning of the 1990s (Podvig 2004). Today, in addition to these foreign assets, Russia mainly relies on seven radars located on its territory to track space objects. It is also constructing three more radars and planning an additional one. In addition to these dedicated systems, Russia is also using the Moscow missile defense system radar Don-2M and the Dunay-3U radar near Moscow to provide early warning and space surveillance data (Russianforces 2012).

The Russian space surveillance system also raises the question of strategic autonomy, as the most advanced of its optical observation stations (*Okno*) is located in Tajikistan. Moreover, the space surveillance network relies on the early warning radars, and on the *Krona* system, composed of dedicated X-band surveillance radars. Two such systems are deployed, one in Zelenchukskaya in the North Caucasus and one in Nakhodka, in the Far East (Russianforces 2012). All in all, despite some

remaining weaknesses, Russia has substantial space surveillance and tracking capabilities, a fundamental asset both for operational military purposes and space security policy elaboration.

20.4 Russian Military Space Policies

After the collapse of the Soviet Union and the difficult decade of the 1990s, Russia intended to rebuild its military space power. A clear political will to do so emerged at the highest level, accompanied by an institutional and industrial reorganization of the space sector, as well as strengthening and modernization of its foundations. It is a major challenge as Russia's military space policies need to adapt to the new geopolitical landscape of the twenty-first century. In the field of "space for security," Russia adopted a pragmatic approach. It sought to match its military spacecraft constellation with its strategic priorities, focusing on the Russian territory and the "near abroad." This marks a clear departure from Soviet policies, which had a more global scope. In the area of "security for space," however, continuity with Soviet practices seems to persist. Russia continues to seek global strategic parity with the USA through a skilful diplomacy based on self-restraint and ambitious diplomatic initiatives.

20.4.1 Space for Security

In terms of military space capabilities, Russia is still, after the USA, the second largest power. However, it cannot afford to be a global military space player anymore. Two factors explain this. First, its level of resources is not sufficient to conduct a high number of military launches and to maintain extensive constellations of military spacecraft in orbit for each military purpose (i.e., communications, navigation, surveillance, ocean surveillance, early warning, signals intelligence, geodesy). Second, the geopolitical environment changed after 1991, and Russia's foreign policy objectives differ from the former Soviet foreign policy. Russia adopted a pragmatic approach, and military capabilities are to be developed only to respond to certain needs and in accordance with existing resources. However, despite Russia's efforts to rebuild credible military space capabilities, there remain some important weaknesses as exposed, for example, during the 2008 war with Georgia.

Russia chose to align its military space capabilities with its new foreign policy objectives. Besides Moscow's desire to regain its status as a global strategic power, Russia mainly aims at strengthening its position as a regional power (Tsygankov 2011). This means, in concrete terms, that Russia's international efforts concentrate on the Community of Independent States (CIS) and on the "near abroad" (Trenin 2009). Accordingly, in the military space field, Russia's objective is not to imitate the USA by becoming a global power focusing on force projection but rather to focus on its own territory and neighboring countries (Facon and Sourbès-Verger 2007c, p. 6). The military space assets were conceived in view of this. While being developed as a global system, the main purpose of the GLONASS

satellite navigation constellation is to cover the Russian territory. In the field of satellite communications, Russia has a couple of GEO (geostationary Earth orbit) communications and data-relay spacecraft but rather focuses on spacecraft in HEO (highly elliptical orbit, or *Molniya* orbit). The Molniya orbits enable a better coverage of Russia's northern territories. Similarly, unlike in the Soviet era, Russia has only limited naval projection capabilities, (Arbatov 2011) and the last ocean surveillance satellite was launched in 2006 (Lardier 2011).

In addition to focusing on its "near abroad," Russia recently developed an increasing strategic interest in the Arctic region. This is linked to economic considerations (presence of huge oil and gas reserves, growing potential of the northern route for shipping, extension of the exclusive economic zone), ecological concerns, and also security aspects (Baev 2012; Roi 2010). Russia's space architecture is also geared to support this new item on the country's foreign policy agenda. In 2008, President Putin approved the *Arktika* satellite constellation. With a budget of $1.23 billion and five satellites to be built (two *Arktika M* satellites with optical monitoring systems, one *Arktika R* radar satellite for the polar nights, and two *Arktika MS* telecommunications satellites), this is the biggest Earth observation (EO) project in Russia of recent years (Robinson and Venet 2010).

In terms of capabilities, Russia is focusing on few strategic areas. In addition, the dual-use approach is much more integrated in military space planning than it was in the Soviet Union, when a strict separation between civilian and military space activities prevailed.

As for specific capabilities, the most important effort is dedicated to maintaining a comprehensive early warning system. This capability is crucial for the credibility of Russia's nuclear deterrence, (Arbatov 2011) which is still the major pillar of Russia's national security policy (Baev 2012, p. 10). The early warning satellite constellation was severely hit by the crisis in the 1990s, as funding issues led to capability gaps of up to 8 months. This was particularly worrisome for global nuclear stability, as it could have led to misinterpretations and false alarms (Moltz 2009). The space component of the Russian early warning system was reconstituted since that time, and Russia has four spacecraft on HEO and one on GEO as of September 2012. The system, however, still lacks global detection capabilities, as it was designed only to observe ballistic missile launches from the USA and not from other regions or from the sea (Russianforces 2012).

A second most important area is satellite navigation, an application of dual-use nature. Besides the *Tsiklon*/*Parus* navigation system used for maritime purposes, the major program in this field is GLONASS (*Globalnaya Navigatsionnaya Sputnikovaya Sistema*). It was launched in 1982 for purely military purposes as a counterpart to the US GPS (Global Positioning System) and reached initial operational capabilities in 1989. The satellite navigation capability was virtually lost in the 1990s, as Russia was unable to maintain enough satellites in orbit, but a new impetus was given to GLONASS in the 2000s. Launches of the improved GLONASS-M satellites resumed in 2004, and the system is now fully operational (Podvig and Zhang 2008, p. 13). GLONASS is a typical example of Russia's new approach to

space, where technological development and socioeconomic benefit considerations prevail over purely military aspects (Facon and Sourbès-Verger 2007b).

Military Earth observation (EO) has a crucial support function for the military, but Russia is facing difficulties in this field. Soviet practices focused on a huge number of launches, putting EO satellites with a very short lifetime in orbit. Despite stated objectives to abandon this costly approach, Russia is still relying on satellites with a very short operational life (between 60 and 130 days) (Lardier 2011). In addition, it has no high-resolution capabilities in optical EO and no radar capabilities at all. Russia plans to also rely on civilian spacecraft for its military needs, demonstrating again a dual-use approach. However, despite ambitious plans in this field, only few EO and meteorology satellites have been launched to date (Robinson and Venet 2010).

In addition to these three areas, Russia maintains basic capabilities in military satellite communications, through 3 GEO *Raduga*/*Globus* satellites, 4 HEO *Meridian* spacecraft, 9 *Strela*/*Rodnik* store-dump military communications satellites, and one *Garpun* data-relay spacecraft (Lardier 2011). Russia is also trying to maintain capabilities in electronic intelligence and geodesy by planning to launch new spacecraft in the coming years.

Despite these efforts to revitalize its military space capabilities, Russia still faces difficulties. The latent capability gaps (lack of high-resolution optical and radar satellites, no global coverage for early warning, limited operational life of spacecraft) were highlighted during the 2008 war with Georgia, as referenced above. GLONASS was not yet operational at that time, and the GPS signal was unavailable over Georgia during the conflict. As a consequence, the Russian command chain had no situational awareness, and satellite targeting could not be used for artillery or precision-guided munitions. In addition, space-based intelligence was deficient, and satellite communications were also not usable. All in all, the war highlighted the general failure of the command and control system, which was supposed to rely on space assets (McDermott 2009; Cohen and Hamilton 2011). After the war, Russian military and political decision-makers pushed for the modernization of the space forces and accelerated in particular the fielding of GLONASS. Finally, the Russian military space forces are plagued with structural issues that are common in the Russian space sector: uncertain funding and discrepancy between ambitious plans and meager realizations. Overall, Russia's military uses of space are still in a transition phase, aiming at refocusing on core activities and modernizing existing assets.

20.4.2 Security for Space

In the field of "security for space," Russia's policy is clearly inherited from the Soviet Union. Russia is still obsessed with the US threat to its nuclear deterrence, and it developed a response based on self-restraint with regard to the issue of space weapons and on diplomatic initiatives to prevent an arms race in outer space.

Russia's perspective on international relations is still influenced by the nineteenth century so-called Great Game of power influence. More specifically, Russian elites identify the (potential or actual) US global hegemony as the major threat to their security and keep calling for a multipolar world order to balance against the threat (Trenin 2009). This perception, inherited from the Cold War thinking, is not reciprocal, as the USA now focuses more on the Asia-Pacific region and no longer considers Russia as an equal strategic partner (Trenin 2011). Moscow's approach is reflected in the Russian military doctrine released in 2010, which identifies the USA and NATO (North Atlantic Treaty Organization) as potential enemies. Russia's threat assessment is focusing in particular on the credibility of its nuclear deterrent, as the USA is thought to possess (or develop) capabilities able to neutralize Russia's strategic nuclear forces. (Śmigielski 2010)

The Russian space security policy stems from this fear. The main security threat in space from Russia's point of view would be a US first strike against its nuclear forces using space-based weapons (Mizin 2007). Accordingly, Russia is strongly opposed to US plans for ballistic missile defense (BMD). This would not represent a direct threat to Russian strategic missiles but would open a door towards space-based weapons integrated into a BMD architecture. This, in turn, could constitute a vital threat to Russia's strategic missile forces. In addition, BMD missiles could easily be used as antisatellite (ASAT) weapons, thus threatening Russian military spacecraft in LEO (Dvorkin 2007).

To counter this threat, Russia is pursuing a strategy of self-restraint in the development of ASAT weapons. Part of this rationale is derived from budgetary considerations, as well as the learning curve inherited from the Cold War. In those days, the Soviet Union and the USA quickly understood the benefits of the status quo in space to preserve a stable strategic balance. After the development and testing of kinetic and laser ASATs in the 1960s–1970s (Stares 1985), the Soviet Union announced a unilateral moratorium on ASAT testing in 1983. In line with this decision, it refrained from launching military space stations in the 1980s, and President Yeltsin ordered to withdraw the IS-M ASAT weapon from operational service in 1993 (Dvorkin 2009). Russia pursued this strategy of self-restraint (Mizin 2007; RiaNovosti 2010) but, nevertheless, warned that any move to weaponize outer space by another nation would be followed by similar measures from Russia (Associated Press 2007). Russia would probably focus on asymmetric means to counter any US move to weaponize outer space, as the development of symmetric capabilities is out of its financial reach (Dvorkin 2009). This means that Russia would not make the same mistake as the Soviet Union to compete with the USA in the development of space-based weapons but rather keep dormant technological capabilities to develop and operate terrestrial ASAT weapons.

The second pillar of Russia's space security strategy consists of diplomatic initiatives aimed at preventing an arms race in outer space. The Soviet Union was a proponent of a stable and open space environment, starting with the cosponsored Partial Test Ban Treaty (PTBT) of 1963 and the Outer Space Treaty of 1967. Soviet delegates were also active at the Conference on Disarmament (CD) to promote the discussion on the Prevention of an Arms Race in Outer Space (PAROS), and the Soviet Union proposed several draft treaties on the issue throughout the 1980s, as

well as the creation of a world organization that would monitor the exchange of "peaceful" space technologies in 1986 (Mizin 2007).

Russia is building on this diplomatic heritage. It proposed, together with China, a draft "Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force Against Outer Space Objects" (PPWT) in 2008. Prior to this proposal, both countries submitted a draft outline for a treaty in 2002, as well as two non-papers on the issue in 2004. Russia's cooperation with China on this matter is guided by the perceived need for both spacefaring nations to balance against the USA in space (Perfilyev 2010). From the Russian point of view, the rationale for the PPWT is to close existing gaps in international space law. Russia equals space weapons to weapons of mass destruction (WMD) and argues that their deployment could have similar destabilizing effect on the global strategic balance (Vasiliev 2008). The PPWT is, however, heavily criticized in its current form by other countries, including the USA, as having three inherent weaknesses. First, it does not capture terrestrially based ASAT weapons. Second, the interpretation of a "threat or use of force against outer space objects" is vague and open to various interpretations. Finally, no definition of "space weapon" is given, and no verification mechanism is proposed (Hitchens 2008). Confronted with a deadlock, Russia seems to have adopted a flexible and pragmatic diplomatic approach and also supports another initiative in the field of space security, the UN-sponsored Group of Governmental Experts (GGE) on Transparency and Confidence-Building Measures (TCBM) in outer space. The Russian delegate, V. Vasiliev, was unanimously designated as chairman of the GGE. The GGE has a 2-year mandate to provide recommendations for space-related TCBMs (Ministry of Foreign Affairs of the Russian Federation 2012). While TCBMs may not be legally binding, as opposed to a treaty, they could, nevertheless, be considered a first step towards an international legal framework governing activities in outer space and thus contributing to a more stable and sustainable environment. By supporting such an approach, Russia showed its willingness to cooperate with other major spacefaring nations on space security issues and adopted a more pragmatic, and potentially more fruitful, approach than, for example, China.

20.5 Conclusions

The Soviet Union was once a superpower in military space, but Russia now struggles to adapt its military space policies to the new geopolitical environment. After the "lost decade" of the 1990s, where it lost many of its military capabilities in space, it has sought to rebuild its military space power. Driven by political considerations (i.e., the need to regain its lost status as a respected global power) and pragmatic reasons (i.e., an increased reliance on space assets in modern warfare), Russia launched in the 2000s ambitious military space initiatives. It strengthened its foundations by reorganizing its space industry, its military institutional architecture in space, and its ground infrastructure.

Despite the strong political will displayed by Moscow's high-level decision-makers, these efforts still suffer from the Soviet legacy. In the field of "space for security," Russia still largely relies on assets developed during the Soviet era and has shortcomings in many operational space capabilities (as demonstrated, e.g., during the war with Georgia in 2008). In the area of "security for space," Russia is still applying the Cold War thinking, focusing on the perceived threat represented by the USA and seeking to balance against its hegemony. While this approach contributed to the remarkable stability of the space environment during the Cold War, it cannot be applied to the space environment of the twenty-first century, which is characterized by an increasing number of actors with military ambitions in space and by competitiveness that could potentially lead to regional space races (e.g., in Asia).[2]

Overall, Russia remains the second biggest military space actor, but its future prospects remain uncertain: Russia proved that it is able to adopt a pragmatic and efficient approach to security issues in space, but it has been, for the past two decades, hobbled by funding issues, program delays, and technical failures.

References

Arbatov A (2011) Russian perspectives on spacepower. In: Lutes C, Hays PL (eds) Towards a theory of spacepower. Selected essays. National Defence University Press, Washington, DC, pp 441–449

Associated Press (2007) Russia promises retaliation if weapons deployed in space http://www.foxnews.com/story/0,2933,298274,00.html. Accessed 2 Oct 2012

Baev P (2012) Russia's arctic policy and the northern fleet modernization. Russie.Nei.Vision n°65 Ifri, Paris

Cohen A, Hamilton RE (2011) The Russian military and the Georgian war: lessons and implications. Strategic Studies Institute, Carlisle Barrack

de Montluc B (2010) Russia's resurgence: prospects for space policy and international cooperation. Space Policy 26(1):15–24

de Selding PB (2012) Overflight dispute delays launch of Metop-B satellite. Space News. http://www.spacenews.com/article/overflight-dispute-delays-launch-metop-b-satellite. Accessed 27 Apr 2012

DeBlois BM, Garwin RL, Kemp RS, Marwell JC (2004) Space weapons. Crossing the U.S. Rubicon. Int Secur 29(2):50–84

Dvorkin V (2007) Threats posed by the U.S. missile shield. Russ Global Aff 2. http://eng.globalaffairs.ru/number/n_8539

Dvorkin V (2009) Programi kosmitcheskikh vooruzhenii. In: Arbatov A, Dvorkin V (eds) Kosmos. Oruzhie, Diplomatia, Bezopasnost. Carnegie Endowment, Moscow, pp 59–84

Facon I, Sourbès-Verger I (2007a) Le spatial russe: implications nationales et internationales d'une apparente remontée en puissance. Fondation pour la Recherche Stratégique, Paris, pp 37–38

Facon I, Sourbès-Verger I (2007b) Le secteur spatial russe. Entre ouverture à l'international et souveraineté nationale. Le Courr des pays de l'Est 1061:47–58

Facon I, Sourbès-Verger I (2007c) La place du spatial dans le projet de restauration de la puissance russe. Fondation pour la Recherche Stratégique, Paris

Government of the Russian Federation (2005) Federalnaïa kosmicheskaïa programma Rossii na 2006–2015 godi

[2]Moltz (2012)

Hitchens T (2008) Russian-Chinese space weapons ban proposal: a critique. In: UNIDIR (ed) Security in space: the next generation – conference report. UNIDIR, Geneva
International Monetary Fund. www.imf.org. Accessed 15 Sep 2012
Lardier C (2011) Panorama des moyens spatiaux militaires actuels. In: Pascallon P, Dossé S (eds) Espace et Défense. L'Harmattan, Paris, pp 37–65
Makarov Y, Payson D (2009) Russian space programmes and industry: defining the new institutions for new conditions. Space Policy 25:90–98
McDermott R (2009) Russia's conventional armed forces and the Georgian war. Parameters 39(1):65–80
Ministry of Defence of the Russian Federation. Aerospace Defence Forces. http://www.eng.mil.ru/en/structure/forces/cosmic.htm. Accessed 19 Sep 2012
Ministry of Foreign Affairs of the Russian Federation (2012) Press release on the first session of the UN group of government experts on transparency and confidence-building measures in outer space activities. Accessed 1 Aug 2012
Mizin V (2007) Russian Perspective on Space Security. In: Logsdon JM, Moltz JC, Hinds ES (eds) Collective security in space. European perspectives. Space Policy Institute, The George Washington University, Washington, DC, pp 75–108
Moltz JC (2009) Russia and China: strategic choices in space. In: Coletta D, Pilch FT (eds) Space and defense policy. Routledge, London/New York, pp 269–289
Moltz JC (2012) Asia's space race. National motivations, regional rivalries and international risks. Columbia University Press, New York
Mueller K (2002) Totem and Taboo: depolarizing the space weaponization debate. RAND Corporation, Santa Monica
Nardon L, Kastoueva-Jean T (2007) La restructuration de l'industrie spatiale russe. Ifri, Paris
Oberg JE (2011) International perspectives: Russia. In: Lutes C, Hays PL (eds) Towards a theory of spacepower. Selected essays. National Defence University Press, Washington, DC, pp 421–440
Perfilyev N (2010) The Sino-Russian space entente. Astropolitics 8:19–34
Podvig P (2004) Russia and military uses of space. Working Paper. The American Academy of Arts and Sciences, Cambridge
Podvig P, Zhang H (2008) Russia and Chinese responses to U.S. military plans in space. The American Academy of Arts and Sciences, Cambridge, MA
Quénelle B (2012) Echecs et remontrances en série dans le secteur spatial russe. Les Echos 27:15
RiaNovosti (2010) Russia has no plans to deploy weapons in space-top brass. Accessed 9 Apr 2010
Robinson J, Venet C (2010) Russia's earth observation activities: overview and prospects for expanded cooperation with Europe. ESPI perspectives, vol 41. ESPI, Vienna, p 4
Roi ML (2010) Russia: the greatest arctic power? J Slav Mil Stud 23:551–573
Russian Space Web. Svobodny. http://www.russianspaceweb.com/svobodny.html. Accessed 28 Sep 2012a
Russian Space Web. Launchers: Cosmos -1, -3 family. http://www.russianspaceweb.com/cosmos3.html. Accessed 28 Sep 2012b
Russian Space Web. Angara family. http://www.russianspaceweb.com/angara.html. Accessed 28 Sep 2012c
Russianforces (2012) Early warning. http://russianforces.org/sprn/. Accessed 28 Sep 2012
Śmigielski R (2010) The Russian federation's military doctrine. Pol Inst Int Aff Bull 28(104):205–206
Stares PB (1985) The militarization of space. U.S. policy, 1945–1984. Cornell University Press, Ithaca, pp 135–156
Trenin D (2009) Russia reborn. Reimagining Moscow's foreign policy. Foreign Aff 88(6):64–78
Trenin D (2011) The U.S.-Russian reset in recess. International Herald Tribune. Accessed 29 Nov 2011

Tsygankov AP (2011) Preserving influence in a changing world. Russia's grand strategy. Probl Post-Communism 58(1):28–44
Vasiliev V (2008) The draft treaty on the prevention of the placement of weapons in outer space, the threat or use of force against outer space objects. In: UNIDIR (ed) Security in space: the next generation – conference report. UNIDIR, Geneva
Venet C (2011) Space in the financial and economic crisis. In: Schrogl K-U, Baranes B, Pagkratis S (eds) Yearbook on space policy 2009/2010. Springer, Wien/New York, p 191