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**THESIS**

**THE FUTURE OF THE BALLISTIC MISSILE SUBMARINE  
FORCE IN THE RUSSIAN NUCLEAR TRIAD**

by

Richard T. Lesiw

September 2008

Thesis Advisor:  
Second Reader:

David Yost  
Mikhail Tsyarkin

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**THE FUTURE OF THE BALLISTIC MISSILE SUBMARINE FORCE  
IN THE RUSSIAN NUCLEAR TRIAD**

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Submitted in partial fulfillment of the  
requirements for the degree of

**MASTER OF ARTS IN SECURITY STUDIES (EUROPE, EURASIA)**

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**NAVAL POSTGRADUATE SCHOOL  
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## **ABSTRACT**

This thesis analyzes the current status of the Russian Federation's ballistic missile submarine force. It reviews the history of the ballistic missile submarine force, its current status, and the implementation of plans currently in progress and as well as the advantages and disadvantages of maintaining a ballistic missile submarine force. This thesis also assesses the other two legs of the nuclear triad – the intercontinental ballistic missiles (ICBMs) and long range bomber aircraft. The status of these two forces and their operational advantages and disadvantages are compared with those of the ballistic missile submarine force. Also examined are the financial and political factors that may affect the prospects of the ballistic missile submarine force. This includes arms control treaties that may affect the force structure. Current and prospective energy prices suggest that the economy of the Russian Federation will be able to provide long term financing for the ballistic missile submarine force and Moscow's other strategic nuclear forces. This thesis concludes that the ballistic missile submarine force is a vital part of the Russian Federation's nuclear triad and will probably be maintained over the next 15 years and beyond.



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## LIST OF ACRONYMS AND ABBREVIATIONS

ABM	Anti-Ballistic Missile
ALCM	Air-Launched Cruise Missile
C <sup>3</sup>	Command, Control, & Communications
GDP	Gross Domestic Product
ICBM	Intercontinental Ballistic Missile
IMF	International Monetary Fund
IRBM	Intermediate Range Ballistic Missile
MIRV	Multiple Independent Re-entry Vehicle
R&D	Research and Development
RF	Russian Federation
RVSN	Strategic Rocket Forces
SLBM	Sea-Launched Ballistic Missile
SLCM	Sea-Launched Cruise Missile
SALT	Strategic Arms Limitation Treaty
SORT	Strategic Offensive Reductions Treaty
SSBN	Ballistic Missile Submarine, Nuclear
SSN	Fast Attack Submarine, Nuclear
START	Strategic Arms Reduction Treaty
VLF	Very Low Frequency
VLW	Very Long Wave



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## **ACKNOWLEDGMENTS**

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## I. INTRODUCTION

The purpose of this thesis is to analyze factors that may shape the future of Russia's nuclear ballistic missile submarine (SSBN) force. The objective is to reach informed judgments as to whether and to what extent the SSBN force will be able to survive in Russia in light of budget constraints, evolving political and strategic priorities, and competition from bomber aircraft and land-based missiles.

One of the key issues is to what extent maintaining ballistic missile submarine capabilities is beneficial to the Russian Federation (RF). Will Russian decision makers abandon the SSBN force in favor of more reliable and financially affordable assets? This thesis examines the characteristics of the SSBN force, including stealth, command and control, maintenance concerns, survivability, and capabilities, and then analyzes its merits and shortcomings. Operational and deterrence mission competition from land- and air-based platforms is examined to assess their role in the future of Russia's nuclear arsenal. Finally, budgetary competition from the rest of the navy is considered as yet another factor that may affect the prospects of the SSBN force.

### A. INTRODUCTION

“The Soviet Union will remain the only power on earth capable of destroying the United States, and modernization of Soviet strategic nuclear forces continues.”<sup>1</sup> This statement in 1991 by Dick Cheney, then Secretary of Defense, emphasizes the importance of Russian nuclear forces in shaping United States national security strategies. The Russian Federation has continued to modernize its nuclear forces and will remain a potential threat to the security of the United States and its allies. By assessing the probable future of Russia's SSBN force, U.S. political and military leaders can ensure that the proper attention is given to it. This thesis attempts to determine what may motivate the Russian leaders to continue maintaining and modernizing the SSBN force.

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<sup>1</sup> Dick Cheney, Secretary of Defense, *Annual Report to the President and the Congress* (Washington, D.C.: Government Printing Office, January 1991), 2.

If the policy of the Russian Federation is changed to downsize to a nuclear dyad, political and military leaders will have to decide which platform to abandon. In the case of the ballistic missile submarines, there are contrasting views as to whether they make a cost-effective contribution to Russia's deterrent force. Several experts have extolled the benefits of the SSBN force. Mikhail Barabanov, an expert with the Center for Strategic and Technological Analysis in Moscow, holds that the SSBN force is essential and that the Navy is attempting to maintain it. He quotes the Russian maritime policy, which is effective through 2010, that states that one of the primary missions for the Navy is providing strategic deterrence, and he declares that the Navy is attempting to support that objective by shifting more funds to the SSBN force.<sup>2</sup>

Eugene Miasnikov, an analyst with the Center for Arms Control, Energy, and Environmental Studies in Moscow, has written several articles promoting the merits of the SSBN force in the strategic deterrent triad for Russia.<sup>3</sup> Miasnikov's arguments focus on the ability of the SSBNs to remain hidden from enemy forces. He states that the ability of the United States submarine force to detect, track, and destroy Russian submarines is overstated, and that the Russian ballistic missile submarines have a higher prospect of survivability than the other strategic forces and constitute Russia's most reliable asset for second strike capability.<sup>4</sup>

Although money may be the primary factor that will determine the future of the SSBN force, the current status of the bases and the potential for a nuclear accident might also affect their future. Michael Jasinski and Cristina Chuen of the Center for Nonproliferation Studies have noted several examples of power failures at bases that

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<sup>2</sup> Barabanov, *The Future of Russia's Strategic Fleet*.

<sup>3</sup> Several of these articles are Eugene Miasnikov, "The Future of Russia's Strategic Nuclear Forces: Discussions and Arguments," <http://www.fas.org/spp/eprint/snf0322.htm> (accessed 11 October 2007).; Eugene Miasnikov, "Collision of Two U.S. Nuclear Powered Submarines on March 19, 1998," <http://www.armscontrol.ru/subs/collisions/comm0319.htm> (accessed 24 October 2007).; Eugene Miasnikov, "Future of Russia's Sea Based Strategic Forces," <http://www.armscontrol.ru/subs/snf/rus/sea0215.htm> (accessed 17 October 2007).; Eugene Miasnikov, "Find and Destroy," *Nezavisimaya Gazeta* (25 October 1994), <http://www.armscontrol.ru/subs/detection/rus/ng102594.htm>.

<sup>4</sup> Miasnikov, *Future of Russia's Sea Based Strategic Forces*; Miasnikov, *The Future of Russia's Strategic Nuclear Forces: Discussions and Arguments*.

support nuclear submarines, and have remarked that such power failures could result in casualties.<sup>5</sup> Nikolai Sokov, an expert at the same center, notes that in the current modernization of the nuclear forces the SSBNs are second in priority after the ICBMs.<sup>6</sup> Rose Gottemoeller, the director of the Carnegie Moscow Center, relates this to the historical background of Russia being a land power. Ground forces have always taken priority over maritime forces in Russia. She also states that the desire of Russia's leaders to be in control of their nuclear missiles and the possibility of losing communications with the submarines tend to focus the priority of the leaders towards the ICBMs.<sup>7</sup> Gottemoeller adds that the SSBN force was on the brink of becoming the predominant element of the nuclear triad when START II was in negotiation. However, due to events such as the failure of the START II treaty to enter into force and be implemented,<sup>8</sup> delays in the new *Borey* class SSBN development owing to financial setbacks, missile technology failures, and the *Kursk* sinking in 2000, the SSBN force has slipped back to a lesser prominence.<sup>9</sup>

## B. MAJOR QUESTIONS AND ARGUMENTS

The major question examined in this thesis is the following: What factors are likely to shape the future of Russia's SSBN force, and what outcome appears to be the most plausible in the next 15 to 20 years? Related questions include the following: What merits does the SSBN force have over the other nuclear delivery systems? What are the major factors that might convince the Russian government to phase out the sea-based

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<sup>5</sup> Cristina Chuen, "Nuclear Issues in the Far Eastern Federal Okrug" in *Preventing Nuclear Meltdown: Managing Decentralization of Russia's Nuclear Complex*, eds. James Clay Moltz, Vladimir A. Orlov and Adam N. Stulberg (Burlington, VT: Ashgate Publishing Company, 2004), 105; Michael Jasinski, "The Military, the Regions, and Nuclear Weapons" in *Preventing Nuclear Meltdown: Managing Decentralization of Russia's Nuclear Complex*, eds. James Clay Moltz, Vladimir A. Orlov and Adam N. Stulberg (Burlington, VT: Ashgate Publishing Company, 2004), 79.

<sup>6</sup> Nikolai Sokov, "Modernization of Strategic Nuclear Weapons in Russia," <http://www.nti.org/db/nisprofs/over/modern.htm> (accessed 17 October 2007).

<sup>7</sup> Rose Gottemoeller, "Nuclear Weapons in Current Russian Policy," in *The Russian Military: Power and Policy*, eds. Steven Miller and Dmitri Trenin (Cambridge, Massachusetts: The MIT Press, 2004), 184.

<sup>8</sup> This is further discussed in Chapter IV.

<sup>9</sup> *Ibid.*, 185, 191-192.

nuclear deterrent? This thesis investigates the hypothesis that the Russian Federation is likely to address successfully the financial difficulties affecting the military, and that the ballistic missile submarine force will probably remain a key element in the nuclear triad and perhaps even become a more vital component in the future.

### **C. METHODOLOGY AND SOURCES**

This thesis analyzes the factors that appear likely to affect the future status of Russia's ballistic missile submarine force. These factors are treated as independent variables that will affect the prospects of the dependent variable of interest – the SSBN force. Each independent variable is examined in a separate section of the thesis. The final section presents conclusions. This thesis relies on primary and secondary sources for information and analytical perspectives.

The point of departure for the analysis, the subject of Chapter II, is the current physical condition of the SSBN force. This includes the current inventory of SSBNs and SLBMs, the status of shipbuilding and missile development and production, and the positive and negative aspects of SSBNs as a leg of the triad. The first independent variable, examined in Chapter III, is the status of the competition to the SSBN force. This includes an analysis of both the ICBM and strategic air forces and how they compare to SLBM capabilities. The other independent variable for the case study, considered in Chapter IV, concerns the political and military doctrine regarding the nuclear forces. This variable includes the political goals of the Russian government, support for defense spending, and the methods of maintaining financial support for the nuclear forces. The political goals of the Russian government appear to include the maintenance of the country's great power status and international prestige. The thesis investigates the extent to which these status goals may generate support for the SSBN force.

## II. THE BALLISTIC MISSILE SUBMARINE FORCE

"From the time of Peter the Great and Catherine the Great, Russian rulers have felt that it was up to them to unite society by promoting state patriotism - namely, people's unity around the tsar (or the communist party leadership) thanks to their pride in belonging to and serving a strong state."<sup>10</sup> During the Soviet period, this was routinely accomplished by promoting the state's strong military might. The leaders wanted to prove to the population that the Union of Soviet Socialist Republics was mighty and that even the United States recognized the Soviet Union as an equal. The Soviet Union achieved superpower status through its ability to generate "enormous military power."<sup>11</sup> The ultimate bulwark of the Soviet state was its military power and force posture.

Now that the Soviet Union has fallen, the Russian Federation has inherited many assets of the former superpower, but it has not obtained the level of international prestige that the USSR once held. Many Russians, including the political elite and military, do not want to abandon the goal of great power status and prefer to invest what is required to maintain the state's prestige.<sup>12</sup> Political and military leaders alike are determined to invest in the country's nuclear weapons program in an effort to regain its "great power status."

In the March/April 2006 issue of *Foreign Affairs*, Keir Lieber and Daryl Press published an article stating their opinion that the United States is about to emerge as the dominant nuclear power. They stated that in the absence of dramatic changes in either U.S. or Russian nuclear forces, Russia "will live in the shadow of U.S. nuclear primacy for many years to come."<sup>13</sup> This controversial article evoked many reactions in Russia

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<sup>10</sup> Vera Tolz. "Politicians' Conceptions of the Russian Nation" in *Contemporary Russian Politics: A Reader*, ed. Archie Brown, (New York: Oxford University Press, 2001), 358.

<sup>11</sup> Steven E. Miller. "Introduction" in *The Russian Military: Power and Policy*, eds. Steven E. Miller and Dmitri Trenin, (Cambridge, Mass.: The MIT Press, 2004), 1.

<sup>12</sup> *Ibid.*, 15.

<sup>13</sup> Keir A. Lieber and Daryl G. Press, "The Rise of U.S. Nuclear Primacy," *Foreign Affairs* 85, no. 2 (March/April, 2006), 43.



and may have contributed to changes in Russian nuclear deterrence policy.<sup>14</sup> In his speech to the Federal Assembly in May 2006 President Vladimir Putin declared that one of the main goals of the military forces was to ensure an increase in the number of strategic nuclear forces.<sup>15</sup> Irina Isakova, a freelance analyst and an Associate Fellow at the Royal United Services Institute (RUSI), quotes Putin as saying that the cornerstone of Russian policy should be strategic deterrence and that it is necessary to ensure national security.<sup>16</sup>

These were not idle statements by the Russian President. In the last few years there has been a large increase in spending on the military in general and especially on nuclear forces. The amount of money spent on national defense has risen every year since Putin assumed the Presidency in 1999-2000 and the proportion going to nuclear programs has increased as well.<sup>17</sup> These trends have continued under Putin's successor as president, Dmitri Medvedev, who took office in May 2008 and named Putin the Prime Minister.

The Russian nuclear weapons posture includes three main categories of long-range strategic delivery platforms: land-based intercontinental ballistic missiles (ICBMs); strategic bomber aircraft armed with air-launched cruise missiles (ALCMs), short range-guided missiles, and other weapons; and nuclear-powered ballistic missile submarines (SSBNs). The idea of a submarine lurking in an unknown location ready to launch multiple nuclear-armed ballistic missiles at unsuspecting targets is a formidable deterrent, and it is the cornerstone of the nuclear arsenals of Britain, France, and the United States.

This thesis focuses on the Russian SSBN force and associated SLBMs. It gives some consideration to the other two legs of Russia's long-range triad: ICBMs and

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<sup>14</sup> Irina Isakova, *Russian Defense Reform: Current Trends* (Carlisle, PA: Strategic Studies Institute, 2006), 2.

<sup>15</sup> Vladimir Putin, "Annual Address to the Federal Assembly," [www.kremlin.ru](http://www.kremlin.ru) (accessed 10 October 2007).

<sup>16</sup> Isakova, *Russian Defense Reform: Current Trends*, 31.

<sup>17</sup> Jane's, "Jane's Defence Budget: Russian Federation," [www.jdm.janes.com](http://www.jdm.janes.com) (accessed 10 October 2007).

strategic bombers. It gives little attention to SLCMs and the many other Russian nuclear delivery systems and warheads that are not accountable under the 1991 Strategic Arms Reduction Treaty (START). The non-START-accountable elements of Russia's nuclear posture include warheads for land-attack cruise missiles, anti-ship cruise missiles, nuclear-capable torpedoes, nuclear-capable anti-submarine missiles, nuclear-capable artillery, land-based tactical missiles, mines, anti-aircraft missiles, anti-ballistic missiles, and gravity bombs and stand-off missiles for land-based naval aviation and other tactical aircraft.

The Russian Federation currently has 14 strategic ballistic missile submarines (SSBNs) and two in construction. Development problems have delayed the completion of the ballistic missile for the *Borey* class SSBN, and the Russians are now struggling to maintain the older submarines in service until these development issues can be resolved. Isakova states that “during the last several years, national defense expenditures have increased on the order of 25-to-30 percent annually.”<sup>18</sup> While the amount of defense spending has increased by around 30% per year, the majority of the money in recent years has gone to modernization and procurement rather than routine maintenance of the forces. While the government is spending more money on new projects, the current forces are deteriorating.

This chapter focuses on the status of the ballistic missile submarine force. It considers the developmental history of the SSBN in the Soviet Union, the current inventory of submarines, the progress in future developments for the fleet, and the advantages and disadvantages of maintaining a ballistic missile submarine force.

## **A. HISTORY OF THE SSBN FORCE**

In order to effectively analyze the status of the Russian SSBN force and where it may be headed, its history needs to be discussed. When nuclear weapons were first placed on ships at sea their primary role was not strategic deterrence – that is, holding an

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<sup>18</sup> Isakova, *Russian Defense Reform: Current Trends*, 40.

adversary's most valued assets at risk – but simply serving as another method of attack during naval combat operations.<sup>19</sup> At the time, strategic deterrence duties were assigned to bomber aircraft.

The first launch of a ballistic missile from a Soviet submarine was conducted on 16 September 1955. Following that success the Soviet Navy began retrofitting five diesel submarines to carry the newly created R-11FM missile. These successes showed the Soviets the potential of submarine-launched ballistic missiles. The Soviets immediately began designing a new class of submarines, the Golf class, whose primary duty was the launching of the R-13 (SS-N-4) ballistic missile.<sup>20</sup>

In 1958, the Soviets began construction of their first nuclear powered submarine, the K-19. This submarine would be the lead boat of an eventual 8 boat fleet of Project 658 class ships, also known as the Hotel class. The construction of these nuclear-powered submarines helped eliminate a key disadvantage of the diesel submarines – having to surface regularly in order to replenish their batteries, thereby increasing their vulnerability to enemy detection. The design of the R-13 ballistic missile required it to be launched on the surface. This meant that the submarine was potentially surfaced for 15-20 minutes in order to launch its complement of missiles.<sup>21</sup> In addition to this vulnerability, the R-13 had an effective range of approximately 600 kilometers (324 nautical miles) which would require the submarine to surface relatively close to its target and consequently within range of enemy anti-submarine assets. To remedy these shortcomings, the Soviets developed the R-21 ballistic missile (SS-N-5), which had a range of 1,400 kilometers (756 nautical miles) and could be launched from a submerged submarine at depths of 40-60 meters (131-197 feet).<sup>22</sup>

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<sup>19</sup> Pavel Podvig, ed., *Russian Strategic Nuclear Forces* (Cambridge, Massachusetts: The MIT Press, 2001), 235.

<sup>20</sup> *Ibid.*, 237, 286.

<sup>21</sup> *Ibid.*, 237.

<sup>22</sup> An excellent history of these developments can be found in: Podvig, *Russian Strategic Nuclear Forces*.

During this same time period, the United States took a different path of development. While the Soviets apparently did not initially intend to use submarine launched ballistic missiles for strategic deterrence purposes, in 1960 the United States launched the *U.S.S. George Washington*, the first SSBN specifically designed for strategic functions. Over the next 7 years the United States built another 40 boats of this class. These submarines were far superior to their Soviet counterparts in their operational performance characteristics, and each carried 16 Polaris missiles with a range of 2,200 kilometers (1188 nautical miles).<sup>23</sup>

The Soviets, sensing a strategic gap developing, responded by designing a new fleet of strategic missile-armed submarines that commenced with the development of the Yankee I class in 1958. These ships of the Project 667A (Yankee I) class were first commissioned in 1967 and were armed with 16 R-27 (SS-N-6) missiles with a range of 2,400 kilometers (1,296 nautical miles). The Soviets eventually commissioned 34 of these second-generation submarines.<sup>24</sup>

The new role of the strategic missile submarines and the short range of the missiles required the boats to utilize patrol areas relatively close to U.S. shores and within U.S. antisubmarine patrol areas. This was an obvious disadvantage and the Soviets worked on designing a missile with a longer range that would not require their boats to get as close to U.S. waters. In the early 1970s, the Soviets solved this dilemma with the creation of the R-29 (SS-N-8) ballistic missile. This missile, deployed on the Project 667B (Delta I) class submarines, had a range of 7,800 kilometers (4,211 nautical miles), which allowed the submarines to launch their missiles at U.S. targets and still remain within Soviet waters.

The new technology and longer range of the Project 667B boats and R-29 missiles, also allowed new strategies to be developed for national defense. The Soviets created “bastions” in areas such as the Barents Sea, White Sea, Sea of Norway, and other

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<sup>23</sup> Pavel Podvig, ed., *Russian Strategic Nuclear Forces* (Cambridge, Massachusetts: The MIT Press, 2001), 240.

<sup>24</sup> Ibid.

seas close to Soviet territory where they were well protected. They patrolled these areas with attack submarines, surface ships, and aircraft to detect any enemy presence. To further deter enemy ships and submarines from entering these bastions minefields were placed at key entry points.<sup>25</sup> To further enhance the survivability of the submarines, they trained on new tactics such as surfacing through the ice and launching while pier side. While it would seem that launching while pier side would make the submarines more vulnerable to enemy attack, this was a new tactic and at the time it was considered safer to keep the SSBNs in port. It was unusual to launch from the pier and if the boat was in port the enemy might think that the SSBN was out of commission and that its launch capability was non-operational and therefore the boat might not be subject to enemy detection and attack. Another factor favoring the retention of SSBNs in port was the Soviet desire to maintain tight central control over launch options.

The Soviets quickly learned the advantages of maintaining an SSBN force and in just 10 years they created a fleet of 56 SSBNs, limited to this ceiling by the SALT I treaty.<sup>26</sup> In order to overcome this limitation, the next generation of submarines carried MIRVed SLBMs. This new class of submarines, Project 667BDR (Delta III), utilized the R-29R (SS-N-18) missiles, which had a range of 6,500 to 8,000 kilometers (3,510 to 4,320 nautical miles) depending on the warhead configuration. These boats replaced the aging Project 629 class boats and were much quieter than their predecessors, enhancing the survivability factor.<sup>27</sup>

Two other classes of SSBNs were developed during the Soviet reign and are still the cornerstone of the Russian SSBN force. They are the Project 941 class (Typhoon) with its R-39 (SS-N-20) missiles that have a range of 10,000 kilometers (5,400 nautical

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<sup>25</sup> Podvig, *Russian Strategic Nuclear Forces*, 242.

<sup>26</sup> The SALT I treaty, approved in 1972, limited the USSR to 62 SSBNs with no more than 950 launchers. A text of the treaty is available at: U.S. Department of State, "Strategic Arms Limitation Talks (SALT I)," <http://www.state.gov/www/global/arms/treaties/salt1.html> (accessed 11 June 2008).

<sup>27</sup> Podvig, *Russian Strategic Nuclear Forces*, 243.

miles) and the Project 667BRDM class (Delta IV) with its R-29RM (SS-N-23) missiles that have a range similar to that of the R-39 missiles.<sup>28</sup>

By the end of the Soviet era, the core of the Navy was the SSBN force and much of the rest of the Navy functioned as its support staff. With the SSBN force split up into the Northern and Pacific Fleets, William Odom noted, “the predominant power of the Soviet Navy was in the Northern and Pacific Fleets to defend the SSBNs with their intercontinental nuclear striking power.”<sup>29</sup>

## **B. CURRENT STATUS OF THE RUSSIAN SSBN FORCE**

After the collapse of the Soviet Union, the ensuing disputes over territories and rights, and the end of the Cold War, the current Russian strategic submarine force is a shell of its former glory. The Soviet fleet peaked at 87 SSBNs in 1978 and has been steadily declining ever since.<sup>30</sup> At the end of 2007, Russia was in possession of only 14 strategic submarines, down from 22 in 2004.<sup>31</sup> This includes several SSBNs that may be in the process of being decommissioned, one that has not finished sea trials yet, and one that has no operational missiles.<sup>32</sup> As of mid-2000, Russian plans reportedly called for 12 strategic submarines as the minimum number for force security.<sup>33</sup>

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<sup>28</sup> Podvig, *Russian Strategic Nuclear Forces*, 243.

<sup>29</sup> William E. Odom, *The Collapse of the Soviet Military* (New Haven, CT: Yale University Press, 1998), 80.

<sup>30</sup> The 87 SSBNs included 25 non-operational submarines in the USSR’s possession. The number of SALT I-accountable submarines peaked at 62 as allowed by the treaty and remained that high until 1990, when a steady decline commenced.

<sup>31</sup> Mikhail Barabanov, “The Future of Russia’s Strategic Fleet,” *Moscow Defense Brief Journal*, <http://mdb.cast.ru/mdb/1-2004/raf/tfotrsf/> (accessed 24 October 2007).

<sup>32</sup> Pavel Podvig, “Strategic Fleet,” <http://russianforces.org/navy/>, (accessed 31 January 2008).

<sup>33</sup> GlobalSecurity.org, “Project 935 / Project 955 Borei,” <http://www.globalsecurity.org/wmd/world/russia/935.htm>, (accessed 31 January 2008).

	Number	Commissioned	Missile	Warheads
Project 667BDR (Delta III)	6	1976-1981	16 SS-N-18	3 per missile = 288
Project 667BDRM (Delta IV)	6	1985-1990	16 SS-N-23	4 per missile = 384
Project 941 (Typhoon)	1	1981	*	
Project 955 (Borey)	1	Est 2008	*	
Total	14		192	672

Table 1. Current Status of Russian SSBN Force

\* The lead ship of the Project 941 class is the only one remaining, and it has been converted to serve as the test platform for the new Bulava missile. The Bulava has not completed trials and therefore is not in full production or deployment. The Project 955 boats are also designed to carry the Bulava missile. The lead ship of this class has not been commissioned and continues to undergo sea trials.

### 1. Service Life of Submarines

The service life of a nuclear submarine is dependent on several factors including operational time, the life of the reactor, and scheduled overhauls. The estimated service life for a nuclear submarine is 25 to 30 years, but this requires a major overhaul every 7 to 8 years. Failure to perform this overhaul can reduce the service life of the submarine by approximately 15 years.<sup>34</sup> It is fairly expensive to perform an overhaul or refueling of a nuclear-powered submarine, and during the Russian financial crisis during the 1990s it is doubtful that these overhauls were performed. According to Pavel Podvig, of the 26 strategic submarines that Russia claimed as active in 2000, only 10 did not require an overhaul.<sup>35</sup>

Some overhauls are being accomplished, however. In December 2007, the R-44 of the Delta III class commenced sea trials following an extensive overhaul. In January 2008, the K-117 Bryansk submarine left Severodvinsk to join the Northern Fleet. The recent overhaul of the K-117 is estimated to have extended its service life by at least another 10 years.<sup>36</sup> Of the 6 operational Project 667BDRM (Delta IV) class boats, this was the fourth boat of the class to complete an overhaul in recent years. There is still one

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<sup>34</sup> Podvig, *Russian Strategic Nuclear Forces*, 244.

<sup>35</sup> *Ibid.*, 245.

<sup>36</sup> Agentstvo Voyennykh Novostey, "Bryansk Nuclear Sub Returning To Northern Fleet," 17 January 2008, reported and translated by OpenSource.gov, 17 January 2008, CEP20080117950152.

boat of the class in overhaul and another is expected to commence its overhaul shortly.<sup>37</sup> The Project 941 Typhoon class also completed a conversion and overhaul in 2002 to be able to test the next generation ballistic missile, the *Bulava*.<sup>38</sup> Such overhauls have been rare and appear unlikely to stave off the shrinking of the SSBN force.

## 2. Project 667BDR (Delta III) Class Submarines

The SSBN force is expected to lose a significant portion of its fleet in a few years, the Delta III class submarines. Original plans of the Russian Navy stated that these submarines were to be phased out by 2007.<sup>39</sup> Of the six that are still considered operational, four are stationed in the Pacific Fleet and two in the Northern Fleet. While the Russians claim to have six operational submarines in this class, two of these submarines appear to be undergoing decommissioning.<sup>40</sup>

As previously stated, the service life of a submarine averages 25 to 30 years. Based on the commissioning dates of the Project 667BDR (Delta III) submarines, these boats have exceeded their operational lifetimes. Even if the submarines themselves are overhauled and refueled and can structurally last for another 10 years, they may be strategically defunct owing to the doubtful reliability of their SLBMs. As stated above, these Project 667BDR submarines utilize the D-9R missile system which includes 16 R-29R (SS-N-18) missiles. Sea based missiles are exposed to a harsher environment than land- or air-based missiles, and subsequently have a shorter life span. The initial life of these missiles is estimated to be about 10 years.<sup>41</sup> Although this life can be extended

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<sup>37</sup> Podvig, "Strategic Fleet."

<sup>38</sup> Janes, "Submarine Forces, Russian Federation," [http://www8.janes.com/Search/documentView.do?docId=/content1/janesdata/yb/juws/juws2170.htm@current&pageSelected=allJanes&keyword=bulava&backPath=http://search.janes.com/Search&Prod\\_Name=JUSWS&](http://www8.janes.com/Search/documentView.do?docId=/content1/janesdata/yb/juws/juws2170.htm@current&pageSelected=allJanes&keyword=bulava&backPath=http://search.janes.com/Search&Prod_Name=JUSWS&), (accessed 31 January 2008).

<sup>39</sup> In his book written in 2000, Nikolai Sokov stated that the original expiration date was 2000, but extended to 2005. Podvig states that the plans are for 2007, but was unexpected to last past 2003. Nikolai Sokov, *Russian Strategic Modernization: The Past and Future* (Lanham, M.D.: Rowman & Littlefield Publishers, Inc, 2000), 126; Podvig, *Russian Strategic Nuclear Forces*, 245.

<sup>40</sup> Podvig, "Strategic Fleet."

<sup>41</sup> Nezavisimoye Voennoye Obozreniye "Development of Navy Strategic Forces Eyed," 11 December 1998, reported and translated by OpenSource.gov, 11 December 1998, FTS19981217000130.



through testing, this adds to the uncertainties associated with these older submarines. Given the operational service date of these submarines, the missiles are almost certainly past their operational expiration date and are no longer strategically reliable. There have been no signs or reports that the Delta III submarine will or can be converted to carry the newer R-29RM *Sineva* missile.

Why have the Russians kept these submarines in operation, and why did they just overhaul one? No conclusive answers to this question are available. However, owing to the developmental problems associated with the *Bulava* missile system (to be discussed later), the Russians may have chosen to maintain these submarines in service to supplement numbers on paper. With 12 SSBNs as the last published force structure minimum, these submarines help to fulfill the quota and may help to deter Russia's adversaries, even if their operational reliability is questionable. There are also reports that the K-44 *Ryazan*, a Delta III SSBN, may have been overhauled to become a new launch platform for the Volna space launcher, a task it performed before in 2002.<sup>42</sup>

### **3. Project 667BDRM (Delta IV) Class Submarines**

Project 667BDRM (Delta IV) submarines are considered the workhorses of the Russian SSBN fleet. The Delta IV class was first introduced into the Soviet fleet in 1984. These submarines are the last in the line of the Project 667 boats and have improved construction and noise reduction capabilities over their predecessors. Over the last few years, four of the six remaining Project BDRM submarines have completed intensive overhauls. As stated earlier, one of the submarines is still in overhaul, and Podvig expects the remaining submarine to enter the shipyard soon.<sup>43</sup> All of these submarines are based in the Northern Fleet.

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<sup>42</sup> Pavel Podvig, "Project 667BDR submarines are staying?" [http://russianforces.org/blog/2007/09/project\\_667bdr\\_submarines\\_are.shtml](http://russianforces.org/blog/2007/09/project_667bdr_submarines_are.shtml), (accessed 29 January 2008).

<sup>43</sup> Pavel Podvig, "Bryansk submarine is back from overhaul" [http://russianforces.org/blog/2008/01/bryansk\\_submarine\\_is\\_back\\_from.shtml](http://russianforces.org/blog/2008/01/bryansk_submarine_is_back_from.shtml), (accessed 29 January 2008).

Following their maintenance, these submarines are expected to be in service for another 10 years.<sup>44</sup> This would correspond to the normal 25 to 30 year life expectancy of the boats and also to the estimated missile service life of 10 years. These submarines are being modified to carry the R-29RM *Sineva* missile. The original version of this missile was discontinued in 1998, but it has been modified to carry multiple warheads.<sup>45</sup> The missiles are designed to carry 4 or 10 MIRVed warheads, but only the 4 warhead version is currently being produced. The Project 667BDRM SSBN can carry 16 *Sineva* missiles, and this corresponds to a total payload of 64 warheads.

The latest reports indicate some developmental delays in the production and deployment of the R-29RM *Sineva* missile. Nevertheless, the few missiles that have been produced are carried on the K-114 *Tula*, which appears to be the only fully operational Project 667BDRM submarine. Two other submarines have completed their overhaul and sea trials and are awaiting missiles, while the K-117 *Bryansk* has completed refit but not sea trials. The final two submarines in the class are awaiting overhaul and refit for the R-29RM missile.<sup>46</sup>

#### **4. Project 941 (Typhoon) Class Submarines**

The *Typhoon* class submarines are virtually extinct. Only one boat remains of this class of giant ballistic missile submarines. These submarines, which were first commissioned in 1980, were armed with the D-19 missile system consisting of 20 R-39 ballistic missiles. The original plan for these submarines was to upgrade the missile system and rearm the boats after the initial service life of the missiles expired, but the plans were scrapped due to the financial crisis in the late 1990s. When the R-39 missiles reached the end of their useful service life, all but one of the associated submarines were decommissioned.<sup>47</sup> The sole submarine of this class still on active service, the TK-208

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<sup>44</sup> Agentstvo Voennoykh Novostey, "Bryansk Nuclear Sub Returning To Northern Fleet."

<sup>45</sup> Podvig, *Russian Strategic Nuclear Forces*, 335.

<sup>46</sup> Pavel Podvig, "Project 667BRDM submarines and Sineva missiles," [http://russianforces.org/blog/2008/04/project\\_667brdm\\_submarines\\_and.shtml#comments](http://russianforces.org/blog/2008/04/project_667brdm_submarines_and.shtml#comments) (accessed 1 April 2008).

<sup>47</sup> *Ibid.*, 306.

*Dmitry Donskoy*, had its missile tubes converted to hold the SS-NX-30 (RSM-56 under START nomenclature) *Bulava* missile. Due to delays in construction of the Project 955 (*Borey*) SSBN class, the Project 941 (*Typhoon*) boat is being used to test the new missile for future use. Due to restrictions in the START I reporting data the missiles that were associated with this class of submarines are still counted as “active” until the decommissioned *Typhoon* boats are no longer considered valid launchers.

## 5. Project 955 (*Borey*) Class Submarines

In late 1996, the shipyard in Severodvinsk commenced building a new ballistic submarine class known as the Project 955 class (*Borey* class). The lead ship of the series, *Yury Dolgoruky*, was initially planned to be completed in 2002, with one ship per year to follow. Due to financial constraints that deadline was postponed. The *Yury Dolgoruky* was finally launched in mid 2007 and is expected to complete sea trials in 2008.<sup>48</sup> The other two ships in construction, the *Alexander Nevsky* and the *Vladimir Monomakh*, are also behind schedule and will not be delivered as planned. According to published Russian plans, the *Alexander Nevsky*, which began construction in 2004, is expected to be launched in 2010; and the *Vladimir Monomakh*, which began construction in 2006, will be launched in 2011.<sup>49</sup> Four boats of this class are currently planned. In December 2007, Deputy Defence Minister Army General Nikolai Makarov insisted that the Russian Navy would receive the *Yury Dolgoruky* in 2008 complete with her *Bulava* missiles.<sup>50</sup> However, in January 2008 it was announced that the *Bulava* may not enter operational service until 2012.<sup>51</sup> This announcement suggests that the Russian authorities will have to decide whether to continue with this class of submarines or switch to a new class that will support the *Sineva* missile complex. The Project 955 class submarines are expected to

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<sup>48</sup> Podvig, “Strategic Fleet.”

<sup>49</sup> Forum, “Russia: Strategic Nuclear Forces Activity Said To Be Nothing But ‘PR’,” 17 December 2007, reported and translated by OpenSource.gov, 17 December 2007, CEP20071217009005.

<sup>50</sup> ITAR-TASS, “RF Navy To Get Yuri Dolgoruky Submarine In 2008 - Dep DM (Adds),” 22 December 2007, reported and translated by OpenSource.gov, 22 December 2007, CEP20071222950108.

<sup>51</sup> Nezavisimoye Voennoye Obozreniye, “Russia: Expert Backs Tried, Tested *Sineva* Technology Over Failing *Bulava*,” 25 January 2008, reported and translated by OpenSource.gov, 25 January 2008, CEP20080125548013.

have 16 missile tubes for *Bulava* missiles. The missile is expected to be armed with 6 MIRVed warheads, which will allow each Borey class SSBN to have a payload of 96 warheads. This is consistent with the 36 *Bulava* missiles already deployed – 20 on the *Dmitry Donskoy (Typhoon)* and 16 on the *Yuri Dolgoruky (Borey)* reported in the latest publicly available START I data as of January 2008.<sup>52</sup>

### C. CURRENT PATH OF THE RUSSIAN SSBN FORCE

One of the major hindrances in the development of the Russian SSBN force has been the failure of the *Bulava* missile to complete its test flights. The missile was first developed in 1997 after its predecessor, the SS-N-28 *Bark*, failed to operate correctly in three test flights. The Moscow Institute of Thermal Technology (MITT) proposed to the military that it could produce a better model, and that this model would be similar to the one it was already developing for the Strategic Rocket Forces. This would then save the military money by having two missiles so similar in design that parts could be interchangeable.<sup>53</sup> At the end of 2007 there had been only three successful launches out of seven attempts. Two of those reported successes were questionable due to unconfirmed reports of problems with the warheads.<sup>54</sup> There is no solid estimate of when these missiles will be accepted for operational use on the Project 955 class submarines. Based on the *Bulava's* test history, Podvig does not expect the *Yury Dolgoruky* to begin operational service until 2009 or later.<sup>55</sup>

Therefore, in reality, the Russian Navy currently has only five submarines – *all Delta IVs* - that are reliably capable of launching ballistic missiles. This is assuming that the R-29R missiles that are on the Project 667BDR (*Delta III*) class boats are

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<sup>52</sup> U.S. Department of State, “START Aggregate Numbers of Strategic Offensive Arms” <http://www.state.gov/t/vci/rls/prsr/2008/102844.htm> (accessed 20 April 2008).

<sup>53</sup> Forum, “Russia Seen Facing Total Lack of Nuclear-Armed Submarines,” 5 December 2007, reported and translated by OpenSource.gov, 5 December 2007, CEP20071206009001.

<sup>54</sup> Pavel Podvig, “Bulava test history,” [http://russianforces.org/blog/2007/11/bulava\\_test\\_history.shtml](http://russianforces.org/blog/2007/11/bulava_test_history.shtml), (accessed 31 January 2008).

<sup>55</sup> Pavel Podvig, “Russian Forces at the end of 2007,” [http://russianforces.org/blog/2007/12/russian\\_forces\\_at\\_the\\_end\\_of\\_2.shtml](http://russianforces.org/blog/2007/12/russian_forces_at_the_end_of_2.shtml), (accessed 31 January 2008).

operationally unreliable and the five Project 667BDRM (*Delta IV*) class submarines not in overhaul are fully loaded. The *Delta IV* boats may not all be sea-worthy, but they could be launch ready at the pier. These submarines are expected to last another 10 years and begin phasing out no later than 2015 based on the *Tula's* overhaul completion date.

The following charts (Figures 1, 2, and 3) represent three potential scenarios for the future inventory of the SSBN force based on current data, trends, and analyst opinions:

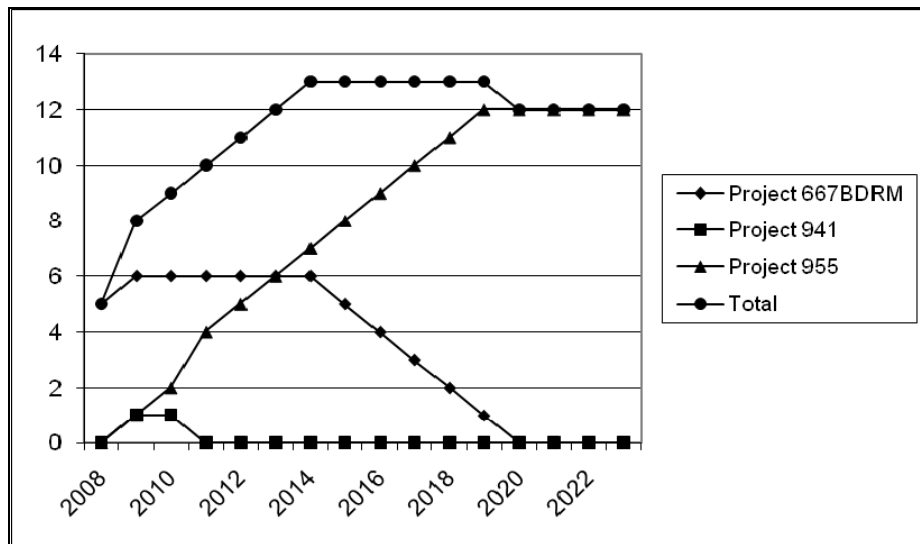


Figure 1. Scenario A for Future of Russian SSBN Force

The above scenario, Scenario A, consists of the following assumptions:

- The minimum force structure of the SSBN force is 12 submarines.
- The Project 667BDR submarines are non-operational.
- The Project 667BDRM submarines will phase out at a rate of one boat per year commencing 2015 based on hull and missile life.
- The *Bulava* will complete testing and enter operational service in 2009.
- The *Typhoon* will briefly re-enter service but be decommissioned in 2010 after 30 years of service.
- The *Yury Dolgoruky* will be commissioned in 2009, *Alexander Nevsky* in 2010, and *Vladimir Monomakh* in 2011.
- The Russian Navy will commence construction of another new Project 955 class submarine in 2008 and every year thereafter until 2016.
- The Russian Navy will complete construction and trials of all new Project 955 class submarines in 3 years.

Scenario A is perhaps the most ambitious plan the Russian Federation could afford to implement for its SSBN force. With this plan, the RF would achieve its goal of 12 submarines relatively quickly, and by 2019 its fleet would consist entirely of Project 955 class submarines that would not reach the end of their 25-year service life until beginning in 2033. At this point the SSBN force will control 1152 warheads, which correlates to 52% of the ceiling of 2,200 operationally deployed strategic nuclear warheads under the 2002 Moscow Treaty, which is also known as the Strategic Offensive Reductions Treaty (SORT).<sup>56</sup> This plan would also give the RF 14 years from the last completed Project 955 class boat until it would need to start commissioning a new fleet of boats to replace the aging Borey class.

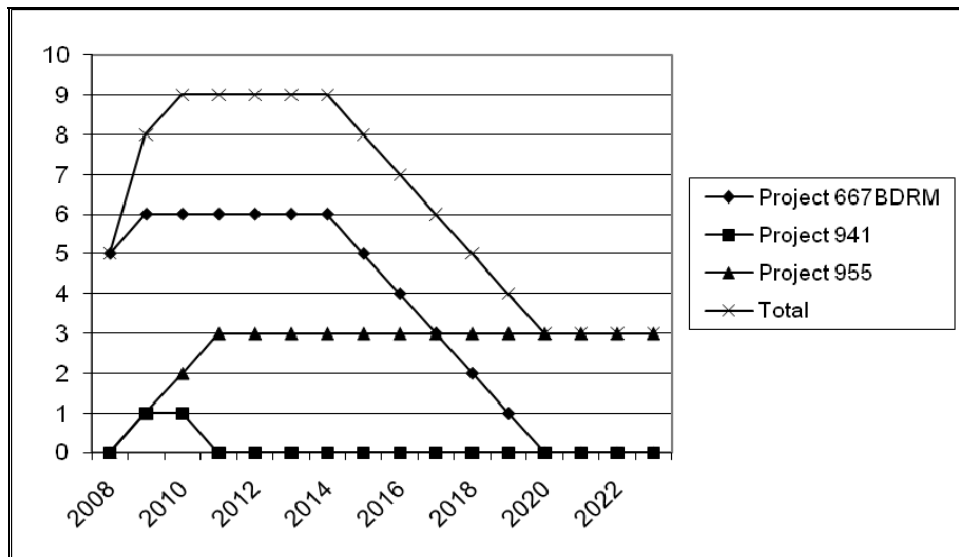


Figure 2. Scenario B for Future of Russian SSBN Force

The above scenario, Scenario B, consists of the following assumptions:

- The minimum force structure of the SSBN force is 12 submarines.
- The Project 667BDR submarines are non-operational.
- The Project 667BDRM submarines will phase out at a rate of one boat per year commencing 2015 based on hull and missile life.
- The *Bulava* will complete testing and enter operational service in 2009.

<sup>56</sup> U.S. Department of State, “Moscow Treaty,” <http://www.state.gov/t/ac/trt/18016.htm>, (accessed 29 January 2008). The Moscow Treaty runs to 31 December 2012, and it is unclear whether it will be amended or replaced by another treaty regime that might affect the Russian SSBN force.

- The *Typhoon* will briefly re-enter service but be decommissioned in 2010 after 30 years of service.
- The *Yury Dolgoruky* will be commissioned in 2009, *Alexander Nevsky* in 2010, and *Vladimir Monomakh* in 2011.
- The Russian Navy will commence construction of another new Project 955 class submarine in 2008 and every year thereafter until 2016.
- The Russian Navy will complete construction and trials of all new Project 955 class submarines in 5 years.

Scenario B is a little more realistic for the completion time of a Project 955 (*Borey*) class submarine based on current trends. With this plan, the force would reach the desired number of 12 submarines in 2021.

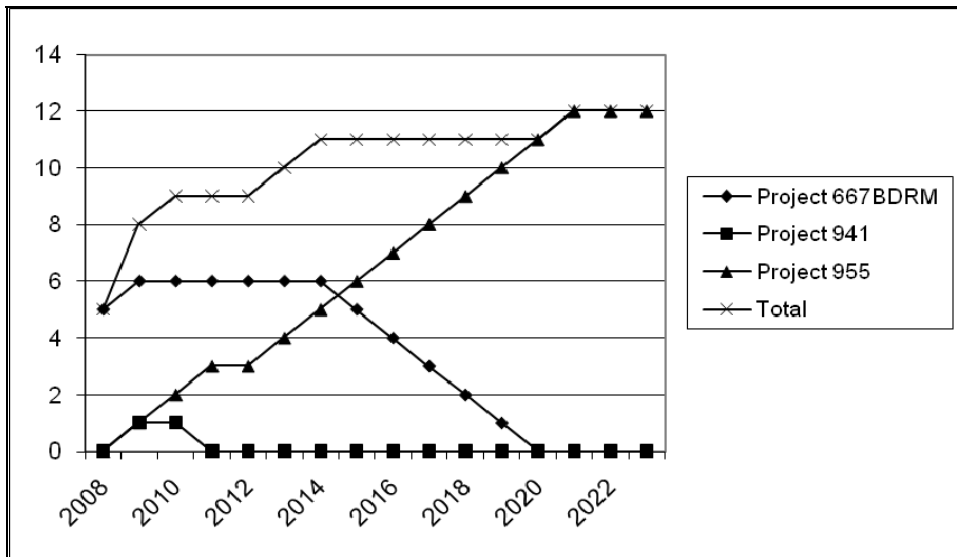


Figure 3. Scenario C for Future of Russian SSBN Force

The above scenario, Scenario C, consists of the following assumptions:

- The Project 667BDR submarines are non-operational.
- The Project 667BDRM submarines will phase out at a rate of one boat per year commencing 2015 based on hull and missile life.
- The *Bulava* will complete testing and enter operational service in 2009.
- The *Typhoon* will briefly re-enter service but be decommissioned in 2010 after 30 years of service.
- The *Yury Dolgoruky* will be commissioned in 2009, *Alexander Nevsky* in 2010, and *Vladimir Monomakh* in 2011.
- The Russian Navy will not build any more submarines of the Project 955 class.

Scenario C illustrates what might happen with the current inventory and boats in construction if the RF chose not to continue to build the Project 955 class boats. Within 10 years the SSBN force would start shrinking by one boat per year, and by 2021 it would consist of only the 3 Project 955 class submarines. They would account for only 288 warheads, which is 13% of the total warheads currently allowed under the Moscow Treaty. If this scenario became reality, it would signify a drastic reduction of the SSBN force within the Russian triad. The force level would be reduced to a level comparable to that of France and the United Kingdom.

#### **D. ADVANTAGES AND DISADVANTAGES OF BALLISTIC MISSILE SUBMARINES**

##### **1. Advantages**

The most predominant advantage of a nuclear-armed submarine fleet is stealth. This stealth, the submarine's ability to evade detection and to constantly change its location, directly relates to one of the most important factors in nuclear weapons deployment: survivability. Miasnikov states that several Russian critics of the SSBN force argue that the SSBNs are more vulnerable to tracking by the enemy than mobile ICBMs are, and that the SSBNs could be easily destroyed by conventional methods. In Miasnikov's view, the judgments of these critics are mistaken and grossly exaggerated.<sup>57</sup>

Due to their inherent stealth and constantly changing location, it would be effectively impossible to destroy all of Russia's SSBNs. Unlike the silo-based ICBMs, they are not in a set location. Effectively neutralizing the SSBNs would require a constant tracking of all the SSBNs at sea. There are several problems associated with this method. First, one would need to find each SSBN. Even if satellite imagery showed the submarine leaving port, once the SSBN submerged it would need to be located and a trail maintained. This would be difficult because longer range missiles allow SSBNs to stay within their local waters, where they are not subject to fixed underwater detection devices. In an article published in 1998, Miasnikov tabulated the estimated detection

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<sup>57</sup> Eugene Miasnikov, "The Future of Russia's Strategic Nuclear Forces: Discussions and Arguments," <http://www.fas.org/spp/eprint/snf0322.htm> (accessed 11 October 2007).



ranges of the current fleet of SSBNs based on his knowledge of U.S. Los Angeles class submarine technology. His estimates showed that U.S. SSNs would have to be extremely close to a Russian SSBN in order to have a decent probability of detecting it. While he did not have any data on the Project 955 (*Borey*) class SSBNs, he estimated that Russian SSBNs were virtually undetectable.<sup>58</sup>

Miasnikov may not be completely accurate in his estimates due to the classified nature of U.S. detection ability. However, even if the detection ranges were doubled, it would require a significant array of assets to destroy the Russian SSBN fleet. As stated earlier, the most effective method of tracking the SSBNs would be to start at the homeport; otherwise it would be difficult to find the submarines in the open ocean. If the Russians deployed 20% of their current nominal SSBN force of 14 boats, two or three submarines, and they were not detected upon leaving the homeport, to effectively detect them in open water would be a substantial challenge. It would take at least two SSNs to detect one Russian SSBN. It would require approximately 50% of the United Kingdom SSN fleet or approximately 10% of the U.S. SSN fleet to detect a single Russian SSBN. It would be unrealistic for either fleet to dedicate that percentage of its forces to tracking Russian SSBNs. As global threats have changed since the end of the Cold War in 1989-1991, the role of submarines has shifted away from anti-submarine warfare. New missions such as intelligence, reconnaissance, and surveillance (ISR); Tomahawk missile strikes; and special force operations help provide vital support for ensuring national security.

This discussion leads back to the primary advantage of an SSBN force: survivability. Since it is highly improbable that all the deployed Russian SSBNs could be constantly tracked, they constitute the ideal platform for a secure second-strike capability. Even if one assumed that all but one of the Russian SSBNs was destroyed in an initial attack and that the remaining submarine was of the Project 667BDRM (*Delta IV*) class with a full payload of 16 ballistic missiles with 4 warheads each, this sole remaining SSBN could strike 64 targets.

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<sup>58</sup> Eugene Miasnikov, "Estimates of submarine detection ranges," <http://www.fas.org/spp/eprint/snf03222.htm>, (accessed 17 October 2007).

This leads to the other major advantage of maintaining an SSBN force. With the current fleet of six Project 667BDR (*Delta III*) and six Project 667BDRM (*Delta IV*) SSBNs, the SSBN force provides 192 SLBMs and 672 warheads –that is, a total of 31% of the accountable warheads allowed under the Moscow Treaty when the numbers are reached in 2012. The SSBNs could control 100% of the 2,200 allowable warheads with as few as 34 Project 667BDRM (*Delta IV*) submarines or 31 Project 955 (*Borey*) submarines. The R-29RM *Sineva* SLBM is capable of carrying 10 warheads; and if it was equipped with this many warheads, it would dramatically increase the number of warheads attributed to the sea-based nuclear forces. The Russians are concurrently developing the RS-24 ICBM, the MIRVed version of the *Topol-M* that also has the capacity to carry 10 warheads per missile (to be discussed in Chapter III), but it would require 68 of these ICBMs to equal the payload of 12 Project 667BDRM (*Delta IV*) SSBNs. These ICBMs also require their crews, a silo, or a mobile launcher, which adds to the operational cost of maintaining them. According to Rose Gottemoeller, “In a burgeoning nuclear crisis, the United States might be tempted to preempt those forces [MIRVed ICBMs], hitting them early and hard in an attempt at a disarming first strike.”<sup>59</sup>

To operate a nuclear submarine at sea is not an inexpensive task. For the submarine to be operational, it needs to have adequate supplies for the crews, the crews need to be operationally trained, and the submarine has to be in perfect working condition. Some could argue that these costs outweigh the benefits, that the Russian economy cannot handle the increased financial responsibility of what the British call “continuous at sea deterrence,” and that the submarines will sit next to the pier, useless in disrepair. However, an SSBN physically unable to go to sea is not strategically irrelevant. A surfaced submarine is effectively a floating array of missile silos. As stated earlier, the Soviets developed intercontinental-range SLBMs that could be launched from SSBNs in port. A docked SSBN may therefore continue to be a formidable force.<sup>60</sup>

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<sup>59</sup> Rose Gottemoeller, "Nuclear Weapons in Current Russian Policy," in *The Russian Military: Power and Policy*, eds. Steven Miller and Dmitri Trenin (Cambridge, Massachusetts: The MIT Press, 2004), 185.

<sup>60</sup> Nezavisimoye Voennoye Obozreniye, “Adm Yerofeyev on Value of Submarine Based Nuclear Forces,” 14 March 1996, reported and translated by OpenSource.gov, 14 March 1996, FTS19960314000766.

In 1996, Admiral Oleg Yerofeyev, Commander of the Northern Fleet, published an article describing the value of the SSBN fleet. In addition to the above mentioned advantages, he countered the argument that the SSBN force places a financial burden on the budget. At the time the article was published, there were 40 SSBNs in the Russian Fleet, and they still had 27 times fewer personnel than the Strategic Rocket Forces. He also stated that American experts had proved that sea-based forces are the more economical leg of the triad.<sup>61</sup> An estimate made in 1995 by B.I. Pustovit, then the expert for the Committee for Military Technical Policy of the Ministry of Defense, stated that the spending on one warhead for the Strategic Rocket Forces would be 3.5 times more than for one warhead in the SSBN force by 2010.<sup>62</sup>

## 2. Disadvantages

While the stealth of the submarine is a great advantage for survivability, it also leads to a disadvantage in the eyes of conservative politicians. As Valery Yarynich has noted, “The exclusive right to authorize use of nuclear weapons belongs to the head of state,” and any loss of communications takes that ability away.<sup>63</sup> All of this falls into the category of command, control, and communications, otherwise known as C<sup>3</sup>. In order to maintain control of nuclear weapons the C<sup>3</sup> structure must be maintained. The core aspects of C<sup>3</sup> are trustworthiness, speed and ease of communications, and combat stability.<sup>64</sup> The two of these most related to the SSBN force are trustworthiness and the speed and ease of communications.

It is extremely difficult to communicate with a submerged SSBN, and there are times that there will be no communications. Other than normal radio communications the

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<sup>61</sup> Nezavisimoye Voennoye Obozreniye, “Adm Yerofeyev on Value of Submarine Based Nuclear Forces,” 14 March 1996, reported and translated by OpenSource.gov, 14 March 1996, FTS19960314000766.

<sup>62</sup> Miasnikov, “The Future of Russia's Strategic Nuclear Forces.”

<sup>63</sup> While Russian policy dictates that the political and military leaders confer on the use of nuclear weapons, in both Russia and the United States release authority resides with the President. Valery Yarynich, *C<sup>3</sup>: Nuclear Command, Control Cooperation*, (Washington D.C.: Center for Defense Information, 2003), 17.

<sup>64</sup> Valery Yarynich, *C<sup>3</sup>: Nuclear Command, Control Cooperation*, 17.

submarine has the capability of receiving very long wave messages (VLW) and very low frequency messages (VLF). VLF messages can be transmitted at a depth of 200-300 meters, but due to the long duration of the transmission they can only send codes and no specific launch orders. This would then require the submarine to go to communications depth (approximately 20 meters) to receive further instructions.<sup>65</sup> This method of communications is mainly used as a backup emergency option. VLW messages can contain more information but they can only penetrate up to about 5 meters in depth, which would require the submarine to already be at communications depth or towing its external antenna, a position that is not normal while on a strategic patrol due to the increased risk of detection and reduced speed and lack of maneuverability of the submarine.<sup>66</sup>

These communication issues are a factor due to the stringent controls that the Russians maintain over their nuclear weapons. The Russian system, which was previously the Soviet system, of controlling nuclear weapons has always been highly centralized; and the possibility of losing “negative control” does not exist.<sup>67</sup> Negative control consists of measures to prevent “accidental or unauthorized launches of nuclear missiles.”<sup>68</sup> Contrary to the Russian system, on U.S. SSBNs the launch codes for the missiles are controlled on board and the Commanding Officer reportedly has the technical capability of launching his missiles without an order from the President.<sup>69</sup> The Russians maintain more stringent controls: the codes to launch the SLBMs must be received from a higher command and are not released until the launch order is given.<sup>70</sup> While little is known about the exact C<sup>3</sup> for Russia’s SSBN nuclear weapons, the communications difficulties constitute an impediment to the strict centralized control that

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<sup>65</sup> Podvig, *Russian Strategic Nuclear Forces*, 279.

<sup>66</sup> Ibid.

<sup>67</sup> Miasnikov, "The Future of Russia's Strategic Nuclear Forces."

<sup>68</sup> Yarynich, *C<sup>3</sup>:Nuclear Command, Control Cooperation*, 20.

<sup>69</sup> Yarynich, *C<sup>3</sup>:Nuclear Command, Control Cooperation*, 212-213.

<sup>70</sup> Miasnikov, "The Future of Russia's Strategic Nuclear Forces"; Valery Yarynich, *C<sup>3</sup>:Nuclear Command, Control Cooperation*, 209.

the RF prefers. As stated above, it has been calculated that it is significantly cheaper to maintain one warhead on an SLBM than on an ICBM. However, maintaining the launcher (the SSBN itself) is a much more expensive task than maintaining an equivalent number of ICBM silos. It has been reported that Russian SSBNs completed 20 percent fewer underway periods in 2007 than they have in previous years.<sup>71</sup>

Year	Annual Patrols
1981	52
1984	105
1986	80
1990	62
1993	19
1997	15
2000	7
2002	0
2006	5
2007	3

Table 2. Number of Russian SSBN Patrols per year.<sup>72</sup>

Vladimir Shamanov, the chief of the combat training department of the Russian Armed Forces, attributes this diminishment to the poor quality of the submarines; they stay next to the pier because they are unreliable and not sea worthy.<sup>73</sup> While this statement reflects the status of all submarines in the Russian fleet, the SSBNs are at the forefront of the issue. Robert S. Norris of the Natural Resources Defense Council (NRDC) and Hans M. Kristensen of the Federation of American Scientists state that “Russia’s general purpose submarine patrols increased only slightly, from four in 2006 to

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<sup>71</sup> ITAR-TASS, “Number of Russian Submarine Sorties Declines 20 Percent (Adds),” 20 January 2008, reported and translated by OpenSource.gov, 30 January 2008, CEP20080130950379.

<sup>72</sup> Table derived from graph located publicly at: Hans Kristensen, “Russian Nuclear Missile Patrols Decrease Again,” FAS Security Blog, <http://www.fas.org/blog/ssp/2008/04/russian-nuclear-missile-submarine-patrols-decrease-again.php>, (accessed 3 June 2008).

<sup>73</sup> Shamanov quoted in ITAR-TASS, “Number of Russian Submarine Sorties Declines 20 Percent (Adds).”

seven in 2007—significantly fewer than the average of twelve patrols conducted each year during the 1990s.”<sup>74</sup>

With proper training, the SSBNs are able to conduct patrols “at the pier,” but this is not the intended function of a billion dollar submarine and the moored SSBN makes an excellent target for enemy strikes. The military must spend a significant portion of the annual defense budget to maintain the operational status of the submarines. As stated earlier, in order for the SSBNs to function during their entire estimated service life they must undergo an extensive, and more expensive, overhaul that takes them out of commission for approximately a year.

Moreover, Russian policy requires that each patrolling SSBN have an SSN escort as it transits out to sea. When the SSBN gets underway, an SSN escort is utilized to conduct sweeps of its patrol path to ensure that there are no lurking enemy submarines standing by to track or destroy the SSBN.<sup>75</sup> Additional funding is needed to ensure the operational functionality of SSBNs and SSNs, including their crews and support staff. The more patrols that the SSBNs make, the greater the quantity of assets required to ensure their functionality and security.

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<sup>74</sup> Robert S. Norris and Hans M. Kristensen, “Russian Nuclear Forces, 2008,” *Bulletin of the Atomic Scientists*, 84, no. 2 (May/June 2008), 57.

<sup>75</sup> Podvig, *Russian Strategic Nuclear Forces*, 276.

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### III. THE COMPETITION

At the beginning of the nuclear era, airplanes were the primary delivery vehicle, and they have remained important delivery platforms in the arsenals of most nuclear-weapon states. On 6 August 1945 the United States delivered the first nuclear bomb utilizing a bomber aircraft. On 15 May 1957 the world's first ICBM was tested by the U.S.S.R. At the beginning of nuclear weapons development an ability to strike regional targets was a more immediate priority for the Soviets than being able to strike the United States homeland. This is why, although the Soviets first tested an ICBM in 1957, they focused on developing and deploying intermediate-range missiles and medium-range bombers for a majority of the next decade and first started to deploy ICBMs and long-range bombers in substantial quantities only toward the end of the 1960s.<sup>76</sup> Nevertheless, for the Soviets, the land- and air-based weapons were their nuclear cornerstone, and the first delivery system that they had capable of attacking U.S. soil was an intercontinental aircraft.<sup>77</sup>

This preference in delivery platforms is still evident in Russia's arsenal today. Of the 4,147 START-accountable nuclear warheads that the Russians reported having at the beginning of 2008, 64% of them are carried on either aircraft or land-based ICBMs.<sup>78</sup> As Rose Gottemoeller has stated, "For most of Russia's history, the oceans simply were not the country's natural medium for warfare."<sup>79</sup>

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<sup>76</sup> Robert P. Berman and John C. Baker, *Soviet Strategic Forces: Requirements and Responses* (Washington, D.C.: The Brookings Institution, 1982), 14; David S. Yost, *Soviet Ballistic Missile Defense and the Western Alliance* (Cambridge, MA: Harvard University Press, 1988), 72.

<sup>77</sup> Pavel Podvig, ed., *Russian Strategic Nuclear Forces* (Cambridge, Massachusetts: The MIT Press, 2001), 4.

<sup>78</sup> U.S. Department of State, "START Aggregate Numbers of Strategic Offensive Arms" <http://www.state.gov/t/vci/rls/prsr/2008/102844.htm> (accessed 20 April 2008). The percentage is based on the reported START I data in the January 2008 exchange of data. If the SS-N-20 missiles from the decommissioned Typhoon submarines were deleted, the actual percentage would be 77%.

<sup>79</sup> Rose Gottemoeller, "Nuclear Weapons in Current Russian Policy," in *The Russian Military: Power and Policy*, eds. Steven Miller and Dmitri Trenin (Cambridge, Massachusetts: The MIT Press, 2004), 184.



## A. ICBMS

### 1. Current Status

In 1959, the Soviets formed the Strategic Rocket Forces (RVSN), which are solely responsible for controlling and launching “all Soviet land-based missiles with ranges exceeding 1,000 kilometers.”<sup>80</sup> These forces continued the great legacy of Russian land armies and were considered to be the successors to the long-range artillerymen of the Russian Army.<sup>81</sup> The RVSN has the prestige of being the only element of Russian intercontinental strike capabilities that is a separate branch of the armed forces of the Russian Federation.

The RVSN is responsible for 2,027 deployed nuclear warheads, a number which equates to 49% of Russia’s entire arsenal.<sup>82</sup> The majority of these warheads are carried on the 481 operational missile systems of four types - the SS-18, SS-19, SS-25, and SS-27 - deployed throughout Russia.<sup>83</sup> The missiles are either housed in silos or on mobile launchers. According to Irina Isakova, a freelance analyst and an Associate Fellow at the Royal United Services Institute (RUSI), London, who previously served as a Specialist Adviser on Russia and the former Soviet Union to the House of Commons Defence Committee (2000-05) and as a foreign policy expert for the Foreign Affairs Committee on the Russian Federation Council, Russia is planning to modernize its strategic forces and complete the plan by 2015 and after that the RVSN will not need any major modernization for another 30 years.<sup>84</sup>

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<sup>80</sup> Harriet Fast Scott and William F. Scott, *The Armed Forces of the USSR* (Boulder, CO: Westview Press, 1984), 147.

<sup>81</sup> *Ibid.*

<sup>82</sup> The percentage is based on the reported START I data in the January 2008 exchange of data. If the SS-N-20 missiles from the decommissioned Typhoon submarines were deleted, the actual percentage would be 57%.

<sup>83</sup> U.S. Department of State, “START Aggregate Numbers of Strategic Offensive Arms.”

<sup>84</sup> Irina Isakova, *Russian Defense Reform: Current Trends* (Carlisle, PA: Strategic Studies Institute, 2006), 34.

**a. SS-18 (*Satan*)**

This missile was originally designed and produced in the early 1970s and has undergone two series of improvements since then. In the early 1980s the original design (the R-36M) was replaced by a newer R-36MUTTH. The newer missile has many upgrades in relation to its predecessor, including a longer range, higher accuracy, and an increased number of warheads. Just as these missiles were being deployed, the designers completed another upgraded version of the *Satan*. This newer version, R-36M2, contained mostly design changes but did improve the accuracy over the R-36MUTTH. The R-36M2 missiles entered service early 1990s.<sup>85</sup>

The SS-18 is a MIRVed missile and is deployed with 10 warheads per missile. The RF will start decommissioning the older R-36MUTTH missiles in 2008, but the R-36M2 missiles will stay in service until around 2020 when their 25 to 30 year service life will have expired.<sup>86</sup> In January 2008, an agreement between Russia and Ukraine on the maintenance of the missiles entered into force. The agreement, which was signed in February 2006, was ratified in January 2008, and will allow Moscow to extend the service life of these missiles to 25 years.<sup>87</sup> The Russian Federation still reports having 104 of these missiles, which are currently the only “heavy” ICBMs in the arsenal.<sup>88</sup>

**b. SS-19 (*Stiletto*)**

The *Stiletto* also went through a rapid series of modernizations similar to the *Satan*. The final version, UR-100NUTTH, was commissioned in 1979. These missiles are equipped with 6 warheads and the RF still maintains 122 of these missiles.<sup>89</sup> The service life of these missiles has been extended to 25 years through a series of test

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<sup>85</sup> Podvig, *Russian Strategic Nuclear Forces*, 215.

<sup>86</sup> Pavel Podvig, “Current Status.”

<sup>87</sup> Agentstvo Voyennykh Novostey, “Duma Ratifies Agreement On Exploitation Of Missile Complex With Ukraine” 25 January 2008, reported and translated by OpenSource.gov 25 January 2008, CEP20080125950193.

<sup>88</sup> U.S. Department of State, “START Aggregate Numbers of Strategic Offensive Arms.”

<sup>89</sup> Ibid.

launches, but that extension is quickly expiring. The last of these missiles were deployed in 1984, so they will probably be retired no later than 2009. The replacement missile for the Stiletto and the *Satan*, the RS-24 to be discussed shortly, is expected to enter service in 2009.<sup>90</sup>

**c. SS-25 (*Topol*)**

The *Topol* was the Soviet Union's first road-mobile ICBM, and it is officially an updated version of the RT-2P silo based missile system. Due to restrictions of the 1979 SALT II treaty, which limited both sides to one new missile design, the SS-25 had to be labeled an update; but Podvig states that this missile is in reality a new design and not a new version of an older missile.<sup>91</sup> This mobile missile system was first deployed in 1988, and a series of test flights in 2007 extended its service life to 21 years and possibly up to 23 years.<sup>92</sup> This is a single warhead system. Although the service life has been extended, SS-25 *Topol* missiles are being replaced by SS-27 *Topol-M* missiles as they are produced. As of January 2008 SS-25 *Topol* missiles constitute the majority of the ICBMs on Russian soil with 201 missiles and warheads.<sup>93</sup>

**d. SS-27 (*Topol-M*)**

In the early 1990s Russia began the design of a new single warhead ICBM suitable for mass production. Russian military authorities wanted the missile to be versatile and suitable for use in both silos and mobile launchers. SS-27 *Topol-M* missiles were first deployed in 1998, and are the only commissioned ICBMs actively produced in Russia today. Russia is building six to seven of these missiles each year and can continue to sustain that production rate for the foreseeable future. First Deputy Prime Minister

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<sup>90</sup> RIA Novosti, "Russia's RS-24 ICBM to enter service in 2009 - SMF commander," 27 February 2008, <http://en.rian.ru/russia/20080227/100186909.html> (accessed 24 July 2008).

<sup>91</sup> Podvig, *Russian Strategic Nuclear Forces*, 230.

<sup>92</sup> Agentstvo Voenykh Novostey, "Russia Test-launches Topol ICBM From Plesetsk Space Center" 18 October 2007, reported and translated by OpenSource.gov 18 October 2007, CEP20071018950024; ITAR-TASS, "Russian Topol ICBM missile destroys target in Northern Range" 18 October 2007, reported and translated by OpenSource.gov 18 October 2007, CEP20071018950052.

<sup>93</sup> U.S. Department of State, "START Aggregate Numbers of Strategic Offensive Arms."

Sergei Ivanov stated that Russia cannot produce 30 missiles a year but does not need that many, a quantity that some experts hold necessary to maintain an adequate number of missiles.<sup>94</sup> The RVSN currently has 48 silo-deployed SS-27 *Topol-Ms* and 6 mobile units deployed throughout the country.<sup>95</sup> In his speech to the Federal Assembly in 2006, President Putin stated that, along with the *Borey* class submarines, the *Topol-M* will form the “backbone of our strategic deterrent force.”<sup>96</sup> By 2015 Russia plans to acquire several dozen more silo-based *Topol-Ms* and 50 mobile systems.<sup>97</sup>

*e. RS-24*

Following Moscow’s announcement in June 2002 that Russia considered itself no longer bound by its signature and ratification of the START II treaty, the issue of MIRVed ICBMs was reintroduced. Under START II all MIRVed ICBMs would have been removed from service or the number of warheads would have been reduced so that there was only one warhead per missile. This would have put a substantial strain on the RVSN as the majority of the ICBM warheads were on the *Satan* and *Stiletto* missiles. With START II no longer an issue, Russia commenced designs on a MIRVed missile. According to Article V, paragraph 12, of the START I treaty, “each party undertakes not to increase the number of warheads attributed to an ICBM or SLBM of an existing or new type,” so Russia was required to build a new model.<sup>98</sup> Similar in design to the *Topol* missile, the RS-24 is not a new missile, but an updated version of the *Topol-M*.<sup>99</sup>

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<sup>94</sup> ITAR-TASS, “Russian Topol ICBM missile destroys target in Northern Range.”

<sup>95</sup> U.S. Department of State, “START Aggregate Numbers of Strategic Offensive Arms.”

<sup>96</sup> Vladimir Putin, “2006 Annual Address to the Federal Assembly,” [http://www.kremlin.ru/eng/speeches/2006/05/10/1823\\_type70029type82912\\_105566.shtml](http://www.kremlin.ru/eng/speeches/2006/05/10/1823_type70029type82912_105566.shtml) (accessed 10 October 2007).

<sup>97</sup> Izvestiya, “Moscow Puts Latest Russian Missile Tests in ‘Political Context’” 18 December 2007, reported and translated by OpenSource.gov 18 December 2007, CEP20071218021007.

<sup>98</sup> U.S. Department of State, “Hypertext of START I Treaty,” Article V Paragraph 12, <http://www.state.gov/www/global/arms/starthtm/start/startI.html>, (accessed 3 February 2008).

<sup>99</sup> Nezavisimaya Gazeta, “Russia: More on 26 Dec RS24 ICBM Launches; Experts say Missiles ‘Not New Design’” 27 December 2007, reported and translated by OpenSource.gov 27 December 2007, CEP20071227009012.

While the RS-24 is extremely similar to the *Topol-M*, designating it as a new missile requires it to undergo extensive testing before it can be delivered to the RVSN. Two test flights were conducted in 2007 and the RVSN commander, Col. Gen. Nikolai Solovtsov, stated that the new missile will enter service in 2009.<sup>100</sup>

## **2. Advantages and Disadvantages of ICBM**

As with every delivery system, the ICBMs have their own set of advantages and disadvantages. The foremost advantage the ICBMs have over SLBMs is in their C<sup>3</sup> reliability. Unlike the SSBNs the ICBMs have a system that allows the RVSN main staff to maintain continuous monitoring and command of the missile regiments.<sup>101</sup> The system in place is extremely redundant and consists of a main system, a reserve system, and another backup system. In addition, each missile army in the field has a “permanent hardened command center and an airborne reserve command center.”<sup>102</sup> The chances of the RVSN losing control or communications connectivity are quite small.

Another advantage that the ICBM force has over the SSBNs is the individualistic nature of the ICBMs. This is vital when it comes to repairs and maintenance periods for the ICBMs. If a silo- or mobile-based launcher fails to perform as required, the RVSN is only losing one missile and its associated warheads for the time it takes to repair it. While an SLBM can be removed from the SSBN for repairs, if the SSBN itself requires repairs, the RF might lose from service all the associated missiles and warheads on the boat during that period, depending on the type and severity of the repairs.

As with the SSBNs, the total lifetime of an ICBM and its launcher is approximately 25 years. An advantage of the ICBM is that the replacement cost is significantly lower. Assuming that the silo is still in working order (as in the past the Russians use the silos from an older missile when replacing it with a newer one), the cost of replacing the missile is far less than that of building a completely new SSBN.

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<sup>100</sup> RIA Novosti, “Russia’s RS-24 ICBM to enter service in 2009 - SMF commander.”

<sup>101</sup> Podvig, *Russian Strategic Nuclear Forces*, 175.

<sup>102</sup> *Ibid.*, 176.

One of the biggest advantages of the SSBN is the biggest disadvantage of the ICBM force: the ability to remain hidden. The silo-based missiles can be located via satellites. Although the mobile launchers can be relocated, they may also be detected by satellite, reconnaissance over-flights, and radar systems.<sup>103</sup> In theory, the silo-based Topol-M is capable of resisting a direct nuclear strike, but that cannot be actually confirmed.<sup>104</sup> Any of the MIRVed missiles might be an attractive target in war.

## **B. ALCM**

### **1. Current Status**

In 2007 Russian intercontinental bombers made the news as they recommenced their strategic patrols. For the first time in 15 years, the *Bear* and the *Blackjack* made patrols towards the United States in a fashion similar to their Cold War tactics of the 1980s.<sup>105</sup> Even though this leg of the strategic nuclear triad controls 15% of the START-accountable warheads in the Russian Federation, intercontinental bombers were long disregarded as Russia struggled to reconstitute its military capabilities after the disintegration of the Soviet Union.<sup>106</sup>

The strategic aircraft has always had a comparatively difficult time taking hold as a useful force in Russian planning for military operations. Strategic bombers in the United States paved the way for an independent Air Force in 1947. The concept of “independent air war had no support in Soviet military circles.”<sup>107</sup> William Odom, a former director of the National Security Agency and an expert on the Soviet Union, wrote

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<sup>103</sup> Bhupendra Jasani, “Satellite Monitoring – Programmes and Prospects” in *Satellites for Arms Control and Crisis Monitoring*, ed. Bhupendra Jasani and Toshibomi Sakata (New York: Oxford University Press, 1987), 17.

<sup>104</sup> Nikolai Sokov, “Modernization of Strategic Nuclear Weapons in Russia: The Emerging New Posture,” May 1998, <http://www.nti.org/db/nisprofs/over/modern.htm>, (accessed 18 October 2007).

<sup>105</sup> *Izvestiya*, “Engels Tu-95MS Aircraft Commander Describes Long Range Aviation Combat Patrols” 21 December 2007, reported and translated by OpenSource.gov 21 December 2007, CEP20071221021002.

<sup>106</sup> The percentage is based on the reported START I data in the January 2008 exchange of data. If the SS-N-20 missiles from the decommissioned Typhoon submarines were deleted, the actual percentage would be 18%.

<sup>107</sup> William Odom, *The Collapse of the Soviet Military*, 81.

that the military saw the role of the Soviet Air Forces as support for the ground forces and rejected the idea that air power could achieve victory.<sup>108</sup> The lack of doctrinal support and a technological lag in the Soviet defense industry created a difficult start for Soviet strategic bombers.

Influenced by the successes that the British and Americans had during World War II, the Soviets started to design their own fleet of bomber aircraft. The first such aircraft, the Tu-4, entered service in 1949 and in 1954 became the first class of planes to drop a Soviet nuclear bomb.<sup>109</sup> Over the next couple of decades the Soviets put significant funding into improving the range of the aircraft and quickly developed intercontinental bombers. During this same period, the Soviets experimented with arming the planes with longer range cruise missiles in order to avoid anti-aircraft fire during their missions.

*a. Tu-95 (Bear)*

During the 1950s, the Soviets began to develop a long-range strategic bomber that would be capable of delivering a nuclear weapon to the United States. After many design variations, the Soviets commissioned the Tu-95 in October 1957. This plane was initially limited to free-fall bombs but the Soviets quickly upgraded this plane to utilize cruise missiles and the Tu-95K was delivered in 1958.<sup>110</sup> Over the next 30 years this plane was the backbone of the strategic aviation forces of the Soviet Union and benefited from many upgrades, concluding with the Tu-95MS aircraft that carry the KH-55 cruise missile. There are two variants of this plane, one that carries 6 missiles in its bomb bay and another that can also carry an additional 10 under its wings.<sup>111</sup>

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<sup>108</sup> William Odom, *The Collapse of the Soviet Military*, 81.

<sup>109</sup> Podvig, *Russian Strategic Nuclear Forces*, 340.

<sup>110</sup> *Ibid.*, 383.

<sup>111</sup> Pavel Podvig, "Strategic Aviation," <http://russianforces.org/aviation/>, (accessed 6 February 2008).

The Tu-95MS was built at a steady pace between 1984 and 1991 and is expected to remain in service until 2010-2015.<sup>112</sup> The Russian Federation currently has 64 each of the two models of the Tu-95MS with a total of 512 missiles and associated warheads.<sup>113</sup>

**b. Tu-160 (*Blackjack*)**

In the 1970s, the Soviets decided that they needed a supersonic strategic bomber and commenced research and development. The first modern bomber in Soviet history was the Tu-160 *Blackjack*, which started deploying in the late 1980s. These aircraft are capable of carrying 12 Kh-55 cruise missiles and being refueled in flight, increasing their range.

At the beginning of 2008, the Russian Federation reported having 15 operational *Blackjack* bombers with a total of 120 missiles and warheads.<sup>114</sup> In January 2008, it was reported that the Kazan Aviation Plant had completed a new Tu-160 aircraft and can produce 1 to 2 new aircraft every year. The goal for these aircraft is to reach a total of 30 by 2025.<sup>115</sup>

**2. Advantages and Disadvantages of ALCM**

In the realm of advantages and disadvantages, the strategic aircraft have many similarities to the SSBNs. When they are airborne, they have the potential to remain hidden, although they are easier to locate than SSBNs via radar systems and easier to track than SSBNs with high speed jet aircraft. While some observers speculated that the Russians were developing a stealth bomber, no such aircraft has been produced as of 2008.<sup>116</sup> Since each aircraft can carry at least six cruise missiles, this provides each

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<sup>112</sup> Podvig, *Russian Strategic Nuclear Forces*, 385.

<sup>113</sup> U.S. Department of State, "START Aggregate Numbers of Strategic Offensive Arms."

<sup>114</sup> *Ibid.*

<sup>115</sup> Information Agency of Tatarstan, "Gorbunov aircraft plant tests new Tu-160" 9 January 2008, <http://www.eng.tatar-inform.ru/news/2008/01/09/10685/>, (accessed 3 February 2008).

<sup>116</sup> Sokov, "Modernization of Strategic Nuclear Weapons in Russia."



launcher with the ability to hit multiple targets, another advantage shared with the SSBNs. They also share a disadvantage with the SSBN force in that if the plane fails to operate, multiple missiles are consequently out of service. In addition, planes, like submarines, are also expensive to produce and costly to maintain. The aircraft also share the C<sup>3</sup> disadvantage of the SSBNs. While it may be easier to maintain contact with an aircraft than a submarine, there is no redundancy in communications equivalent to that with the ICBMs, and the Russian leaders might lose contact with their bomber aircraft.<sup>117</sup>

The strategic bombers have advantages and disadvantages distinct from those of other platforms. In the event of a surprise enemy attack, these aircraft can take off and avoid being destroyed and upload target information for the missiles while airborne. On the other hand, the planes are currently based at only two installations; and if they failed to take off quickly, they might be destroyed. According to Pavel Podvig, “During peacetime, however, the Soviet Union never kept its strategic bombers on alert with nuclear munitions. The Russian Long-Range Aviation presumably follows the Soviet practice.”<sup>118</sup>

As stated earlier, these aircraft in 2007 resumed their strategic patrols after a 15 year break in such operations. During this time period, there was a turnover of personnel, and now the strategic bomber force is left with a majority of junior pilots. In 2002 it was reported that due to funding shortages, these newly graduated pilots have had little experience in the cockpit.<sup>119</sup> Lieutenant Colonel Gennadiy Stekachev, the commander of a Tu-95 strategic missile-equipped aircraft, states that prior to the resumption of the strategic patrols, his pilots would only receive about 40 hours of flight time per year versus the annual standard of 180 hours for U.S. pilots. However, this new era of strategic patrols has increased the annual flight time for the current crop of pilots to 80 to 100 hours. He adds that, prior to the resumption of flight patrols, it took five years for a

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<sup>117</sup> Rose Gottemoeller, "Nuclear Weapons in Current Russian Policy," 184.

<sup>118</sup> Pavel Podvig, *Russian Strategic Nuclear Forces*, 363.

<sup>119</sup> Cristina Chuen, "Nuclear Issues in the Far Eastern Federal Okrug" in *Preventing Nuclear Meltdown: Managing Decentralization of Russia's Nuclear Complex*, eds. James Clay Moltz, Vladimir A. Orlov and Adam N. Stulberg (Burlington, VT: Ashgate Publishing Company, 2004), 125.

pilot to be trained to operate a strategic bomber, but the Russians completely trained eight “young” crews in 2007.<sup>120</sup> Inexperience could nonetheless be a major hindrance in the event that strategic bomber services were required.

### C. SEA-LAUNCHED CRUISE MISSILES

This last category is not part of the official nuclear strategic deterrent triad, but is a competitor to the SSBN force. In 2005, it was reported that Russia still maintained the SS-N-21 *Sampson* sea-launched cruise missile.<sup>121</sup> This missile has a range of 3000 km and is launched from one of Russia’s many fast attack submarines. Moreover, according to some sources, it may be converted for launch from surface ships.<sup>122</sup> While this missile has a small payload of 150kg, it can still be considered a deterrent threat as a nuclear warhead would cause massive damage and loss of life if launched at a major city.

These missiles, as they are launched from a submarine, have the same advantages and disadvantages as an SSBN with the exception that the submarines used are dual purpose. These boats can carry out their primary mission as an SSN and when called upon launch their nuclear cruise missiles at their intended target. These missiles were due to be withdrawn based on the START II treaty, but now have a new potential of being utilized.<sup>123</sup>

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<sup>120</sup> Izvestiya. “Engels Tu-95MS Aircraft Commander Describes Long Range Aviation Combat Patrols” 21 December 2007, reported and translated by OpenSource.gov 21 December 2007, CEP20071221021002.

<sup>121</sup> Andrew Feickert, *Missile Survey: Ballistic and Cruise Missiles of Selected Foreign Countries* (Washington, DC: Congressional Research Service), 2005, 29.

<sup>122</sup> MissileThreat.com, “MissileThreat: SS-N-21,” Claremont Institute, [http://www.missilethreat.com/cruise/id.100/cruise\\_detail.asp](http://www.missilethreat.com/cruise/id.100/cruise_detail.asp), (accessed 26 April 2008).

<sup>123</sup> Jane’s, “World Navies: Russian Federation,” <http://jmsa.janes.com> (accessed 17 October 2007).

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## IV. FINANCIAL AND POLITICAL FACTORS

In order for the nuclear triad to continue to exist and assist the Russian Federation in ensuring its security and pursuing worldwide prestige, there needs to be backing from both the political and military leaders of the country. Some signs of debate in this regard have been visible. Victor Yesin, a former head of the Military Department of the Security Council of Russia and a reserve Colonel-General of the Russian Strategic Missile Troops, has stated that the government is putting too much money into maintaining nuclear forces, that the threat of nuclear war is now negligible, and that Russia should proceed in the same manner as the French, who have eliminated their land-based nuclear missiles.<sup>124</sup> Pavel Baev, a senior researcher at the International Peace Research Institute in Oslo, has written that while the nuclear forces are vital to Russia, they should not be so prioritized that they hinder development of the country's conventional forces.<sup>125</sup>

When he was still serving as President, Vladimir Putin (who is now Prime Minister) stated that Russia plans to maintain the entire nuclear triad, and several experts believe that it will survive. "On March 30, 2006, President Putin, addressing a special meeting on the military nuclear complex, said that 'analysis of the current international environment and prospective trends of its development determines that Russia should consider nuclear deterrence as a cornerstone of its policy.'"<sup>126</sup> Irina Isakova, a freelance analyst and an Associate Fellow at the Royal United Services Institute for Defence and Security Studies in London, stated in 2006 that the nuclear program has received 100% funding over the last few years and that Russia will retain nuclear forces that are capable

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<sup>124</sup> Vasilij Kasarin, "Retribution Will be Inevitable," *Oborona.ru*, <http://www.oborona.ru/article/?id=2001196&category=3526> (accessed 8 October 2007).

<sup>125</sup> Pavel Baev, "Russia's Military - the Best Case," *Jane's*, February 2001, [http://www8.janes.com/Search/documentView.do?docId=/content1/janesdata/srep/srep090/s0900006.htm@current&pageSelected=allJanes&keyword=Russia%20Nuclear&backPath=http://search.janes.com/Search&Prod\\_Name=SREP090&#Ref4](http://www8.janes.com/Search/documentView.do?docId=/content1/janesdata/srep/srep090/s0900006.htm@current&pageSelected=allJanes&keyword=Russia%20Nuclear&backPath=http://search.janes.com/Search&Prod_Name=SREP090&#Ref4) (accessed 11 October 2007).

<sup>126</sup> Irina Isakova, *Russian Defense Reform: Current Trends* (Carlisle, PA: Strategic Studies Institute, 2006), 31; Wade Boese, "Russian Nuclear Ambitions Exceed Reality," *Arms Control Today* 36, no. 1 (January/February 2006).

of delivering an attack without having to base them in third countries.<sup>127</sup> In contrast, in 2000, at the start of the Putin era, Nikolai Sokov, a senior research associate at the Center for Nonproliferation Studies, wrote that modernization of the nuclear triad was underway but at a slow pace. He also stated that under the plans at the time it would not be unexpected for Russia to transition to a dyad consisting of ICBMs and SLBMs.<sup>128</sup> Sokov's comment was written prior to Russia's decision not to feel bound by its signature and ratification of the START II treaty, in view of the fact that the United States regarded the conditions that Moscow attached to its instrument of ratification as unacceptable. START II would have prohibited MIRVed ICBMs, and this would probably have led Russia to place more emphasis on MIRVed SLBMs.

This chapter focuses on the financial and political factors that will affect the development of the Russian Federation's nuclear triad. Specifically, the chapter discusses the political goals that the leaders envision regarding the nuclear deterrent forces, including the size of the forces and the treaties limiting them; how defense spending has been changing and may need to be modified to support the nuclear forces; and national economic prospects and the capacity to support defense spending.

## A. POLITICAL FACTORS

Dmitriy Litovkin, a commentator for the Russian newspaper *Izvestiya*, summed up the importance of nuclear forces in the view of many Russians as follows:

ICBMs are Russia's 'shield and sword.' Weapons that have never been used in combat and, God grant, never will be used. Nevertheless, today they play the main role in defending the country against any external aggression. Hidden deep in the forests, impenetrable by warheads of any kind in concrete silos, or sited on mobile launchers, these systems can be launched and hit their targets whatever the situation. No matter where the enemy may be or how he may hide, he will be destroyed.<sup>129</sup>

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<sup>127</sup> Isakova, *Russian Defense Reform: Current Trends*, 34.

<sup>128</sup> Nikolai Sokov, *Russian Strategic Modernization: The Past and Future* (Lanham, MD: Rowman & Littlefield Publishers, Inc, 2000), 146.

<sup>129</sup> *Izvestiya*, "Moscow Puts Latest Russian Missile Tests in 'Political Context'" 18 December 2007, reported and translated by OpenSource.gov 18 December 2007, CEP20071218021007.

## 1. Policies and Reform

The “first use” policy of nuclear weapons in Russian security doctrine has been present since 1993. When President Putin published the National Security Concept in 2000, his first as President, nuclear weapons were described as vital in ensuring the security and sovereignty of Russia. “The main task of the Russian Federation is to deter aggressions of any scale against it and its allies, including with the use of nuclear weapons.”<sup>130</sup> While Russia desires cooperation with its Western counterparts, it will not sacrifice security to achieve this goal. One of the major points that Russia will not concede on is Western domination of nuclear or conventional military status.<sup>131</sup>

In the Russian National Security Concept of 2000, some of the key points related to the functions of nuclear weapons include the following:

- Nuclear weapons are an effective deterrent against aggressors at Russia or its allies and continue to be a major factor in international peace.<sup>132</sup>
- “The Russian Federation must have nuclear forces capable of delivering specified damage to any aggressor state or a coalition of states in any situation.”
- “The use of all available means and forces, including nuclear weapons, in case of the need to repel an armed aggression when all other means of settling the crisis situation have been exhausted or proved ineffective.”<sup>133</sup>

Even with these published policies, by the end of December 2000 the role of nuclear weapons had not been solidified in Russian military and political doctrine. During the summer of 2000, the military was having a heated debate on whether nuclear or conventional forces should dominate the country’s military priorities. The Chief of the General Staff at that time, Anatoly Kvashnin, had proposed that the military shift away from an emphasis on nuclear weapons and focus on improving conventional forces. According to Nikolai Sokov, this debate resulted in questions about a rapid

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<sup>130</sup> Federation of Atomic Scientists, “National Security Concept of the Russian Federation,” <http://www.fas.org/nuke/guide/russia/doctrine/gazeta012400.htm>, (accessed 8 July 2008).

<sup>131</sup> Celeste A. Wallander, “Russia’s National Security Policy in 2000,” *Program on New Approaches to Russian Security, Policy Memo* 102 (2000), 6.

<sup>132</sup> Charles J. Dick, “Russia’s New Doctrine takes dark world view,” *Jane’s Intelligence Review* January (2000): 17.

<sup>133</sup> Federation of Atomic Scientists, “National Security Concept of the Russian Federation.”

“denuclearization” of the defense policy, but at the time all indications showed otherwise. The evidence pointed to Russia commencing a gradual decline in its nuclear forces as the older weapons were decommissioned and the nuclear delivery systems were converted to carry conventional warheads.<sup>134</sup>

It was not until the debacle in Chechnya during 2001-2002 that Russia started to re-focus on its nuclear arsenal. In his speech to the Federal Assembly in April 2001, President Putin stated that “only recently we were being told that our army is in a state of disintegration and that we should not hope for any shadow of military success.”<sup>135</sup> This failure brought the inadequacies of the conventional military forces to the forefront. Russian leaders felt they had to remedy this situation because the military is one of the instruments of Russia’s global influence and because they were concerned about the eastward expansion of NATO.<sup>136</sup>

It was clear to the Russian leaders that military reform was needed immediately. An important facet of the reform needs was the fact that public confidence in the military was waning. In 2002, Theodore Gerber, a professor of sociology at the University of Wisconsin–Madison, and Sarah Mendelson, a senior fellow in the Russia and Eurasia Program at the Center for Strategic and International Studies (CSIS), conducted opinion polls among Russian citizens. They determined that only about half of the Russians surveyed had confidence in the military and that 68% of those surveyed believed that a political party’s views on military reform were important.<sup>137</sup> Halfway through his first term, Putin needed to take action or he might have lost his public support.

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<sup>134</sup> Nikolai Sokov, “‘Kosovo Syndrome’ and the Great Nuclear Debate of 2000” *Program on New Approaches to Russian Security*, Policy Memo 181 (2000), 1.

<sup>135</sup> Vladimir Putin, “2001 Annual Address to the Federal Assembly,” [http://www.kremlin.ru/eng/speeches/2001/04/03/0000\\_type70029type82912\\_70660.shtml](http://www.kremlin.ru/eng/speeches/2001/04/03/0000_type70029type82912_70660.shtml), (accessed 13 February 2008).

<sup>136</sup> Dick, “Russia’s New Doctrine takes dark world view,” 19.

<sup>137</sup> Theodore Gerber and Sarah Mendelson, “Strong Public Support for Military Reform in Russia” *Program on New Approaches to Russian Security*, Policy memo 288 (2003), 3.

In December 2001, the United States announced its intention to withdraw from the Anti-Ballistic Missile (ABM) Treaty. Although the U.S. decision was publicly justified by the expressed intention to intercept missiles that might be developed by rogue states such as Iran, Russia voiced its concern. Russia had anticipated that the United States might withdraw from the ABM Treaty and made its ratification of the START II treaty in April 2000 conditional on continued U.S. adherence to the ABM Treaty and on U.S. ratification of the 1997 protocols to the ABM Treaty. Moscow knew that these conditions were unacceptable to the United States and that ratification of START II with these conditions would almost certainly mean that START II would never enter into force.

By dooming START II, the Russian leadership gave Russia's nuclear forces a new lease on life. Many of the vestiges of the Soviet nuclear arsenal, and its prestige, were saved. This included MIRVed ICBMs, which carried a majority of Moscow's warhead arsenal. The conflict over the priority of conventional or nuclear forces within the Russian military ended with nuclear forces being the cost-effective victor.

In his May 2003 speech to the Federal Assembly, President Putin addressed in detail the progress of military reform for the first time in his presidency. In this speech, Putin not only described the reforms in progress; he also spoke of the importance of the nuclear forces in Russia: "A serious part of reforms to the armed forces will be consolidation and modernization of our nuclear deterrent forces."<sup>138</sup> In July that same year, Putin again stressed the importance of the nuclear forces and their significance for the country's status. He stated that "Russia must and will stay a great nuclear power" in speaking to scientists at the Federal Nuclear Center.<sup>139</sup>

There is still the perception, dating back to Soviet and ancient Russian history, that the military is the cornerstone of Russian power and that a strong military creates a

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<sup>138</sup> Vladimir Putin, "2003 Annual Address to the Federal Assembly," [http://www.kremlin.ru/eng/speeches/2003/05/16/0000\\_type70029type82912\\_44692.shtml](http://www.kremlin.ru/eng/speeches/2003/05/16/0000_type70029type82912_44692.shtml) (accessed 13 February 2008).

<sup>139</sup> President of Russia Web Portal, "President Vladimir Putin met with the personnel of the Russian Federal Nuclear Centre" <http://www.kremlin.ru/eng/text/news/2003/07/159419.shtml> (accessed 13 February 2008).



strong state.<sup>140</sup> This perception has a significant influence on developments because Russians generally want a strong military, but cannot afford the military that they desire. Until Russia can afford the conventional forces that it desires, Moscow will continue to invest heavily in nuclear forces. In a speech given at a meeting concerning the nuclear weapons complex, President Putin stated that Russians are “compelled to realize that nuclear deterrence is a key element in guaranteeing the country’s security. And the Russian nuclear weapons complex constitutes the material basis for this nuclear deterrence policy.”<sup>141</sup>

In conformity with the National Security Concept of 2000, Russia has continued to emphasize the utility of nuclear weapons in ensuring national security and territorial integrity. In response to the continuing NATO enlargement process, Putin stated in November 2007 that “Russian nuclear forces would be ready with an adequate response to any aggressor.”<sup>142</sup> Putin also characterized the tests of Russian ICBMs as a “substantial contribution to the strengthening of the country’s defense capability.”<sup>143</sup>

Since the U.S. withdrawal from the ABM treaty, the Russian government has expressed interest in improving its capabilities to penetrate missile defense systems. Isakova summed up Russian public statements about the new characteristics of the nuclear posture as follows: “balance, but not parity; minimal deterrence; asymmetric response; return of MIRVs; and, Russia’s possible unilateral withdrawal from the Intermediate Range Nuclear Force Treaty as a response to similar U.S. actions.”<sup>144</sup>

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<sup>140</sup> Steven E. Miller. “Introduction” in *The Russian Military: Power and Policy*, eds. Steven E. Miller and Dmitri Trenin, (Cambridge, Mass.: The MIT Press, 2004), 31.

<sup>141</sup> Vladimir Putin, “Opening Address at Meeting on Developing Russia's Nuclear Weapons Complex,” [http://www.kremlin.ru/eng/text/speeches/2006/03/30/2300\\_type82912type82913\\_104010.shtml](http://www.kremlin.ru/eng/text/speeches/2006/03/30/2300_type82912type82913_104010.shtml) (accessed 10 February 2008).

<sup>142</sup> Reuters “Putin reacts to NATO 'muscle-flexing',” *Reuters*, 20 November 2007.

<sup>143</sup> Vesti TV, “Putin says latest missile launches strengthen Russia's defence capability,” 26 December 2007, reported and translated by OpenSource.gov, 26 December 2007, CEP20071226950348.

<sup>144</sup> Isakova, *Russian Defense Reform: Current Trends*, 32.

## 2. U.S. & Russian Nuclear Arms Treaties

The actual number of warheads that Russia needs to maintain “minimum deterrence” has not been published, but treaty commitments suggest how many Russia may deploy in the next several years. On 24 May 2002, Russia and the United States signed the Moscow Treaty (also known as the Strategic Offensive Reductions Treaty or SORT) that limits each side to between 1,700 and 2,200 operationally deployed strategic nuclear warheads on 31 December 2012. This treaty marks the lowest number of operationally deployed strategic nuclear warheads that each country will have since the end of the Cold War.

Prior to agreeing to conclude the Moscow Treaty, President Bush had expressed his desire to continue reducing the number of U.S. nuclear warheads unilaterally and did not see any need for a formal legally binding agreement. At President Putin’s request, the United States agreed to conclude the Moscow Treaty, but no formal agreements have yet been concluded to follow the START I treaty, which expires in December 2009, or the Moscow Treaty, which expires in December 2012. On 21 May 2008, John Rood, the Acting Under Secretary of State for Arms Control and International Security, gave insights about the current U.S. administration’s view on the future of nuclear arms control treaties between the United States and Russia:

At present we have a difference of opinion with our Russian colleagues. Our view in the administration is that we want a treaty that will set limits on strategic nuclear warheads. We think that that is the appropriate focus of the follow-on treaty. Our Russian colleagues have sought a treaty with a broader scope, something which would also cover conventional armaments and conventional delivery systems and things of that nature.

We are in the process of transitioning to a greater reliance on conventional weapons and a reduced reliance on nuclear forces. We therefore don't wish to expand the scope of the treaty in the manner -- or other legally binding agreement -- in the manner that our Russian colleagues have identified.

Both sides, the Russians and the United States, do not wish to simply continue the existing START treaty. It's a phone book-size document of 750 pages. The negotiations began under Brezhnev when he was leader of the Soviet Union and were concluded under Gorbachev. And so we both recognize they need to be updated as a minimum.

We in the United States would like another approach, as I said, that focuses on strategic nuclear warheads and sets limitations upon them.<sup>145</sup>

Although this is a policy statement of the Bush administration, the 2008 Presidential candidates have expressed interest in pursuing new arms control treaties with the Russians.<sup>146</sup>

Why did Moscow insist on a legally binding treaty and not just unilaterally reduce its operationally deployed strategic nuclear warheads as the United States government would have preferred to do? While there are no definite answers to this question, one plausible reason could be the financial burden that the nuclear competition presents for the Russian economy. The START I treaty held both Russia and the United States to 6,000 “accountable” warheads, an accomplishment reached in 2001.<sup>147</sup> When START I entered into force in 1994, Russia already saw a warhead gap developing. When both sides reached their START I quota of warheads, the U.S. had 5,966 warheads against Russia’s 4,384 warheads.<sup>148</sup> This gap was not a problem at the time since it was believed that START II would reduce both sides to between 3,000 and 3,500 warheads.

If the limits of START II had been reached (a hypothetical question since the treaty never entered into force), the United States would have had 3,456 warheads compared to Russia’s projected 3,253 warheads. Amy Woolf, a specialist in national defense for the Congressional Research Service, notes that this number for Russia would have required over 800 ICBMs, 13 ballistic missile submarines, and 78 aircraft. Most

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<sup>145</sup> John Rood quoted in United States, Cong. Senate. Foreign Relations Committee. *Treaty Doc. 110-7, Treaty Between the Governments of the United States of America and the United Kingdom Concerning Defense Trade Cooperation and Treaty Doc. 110-10, Treaty Between the Governments of the United States of America and Australia Concerning Defense Trade Cooperation*, Federal News Service, 21 May 2008.

<sup>146</sup> Pavel Podvig, “The push for a new arms control agreement with Russia is ill-conceived” [http://russianforces.org/blog/2008/06/the\\_push\\_for\\_a\\_new\\_arms\\_control.html](http://russianforces.org/blog/2008/06/the_push_for_a_new_arms_control.html), (accessed 3 June 2008).

<sup>147</sup> The White House, “Strategic Offensive Reductions Treaty” <http://www.whitehouse.gov/news/releases/2002/05/20020524-3.html>, (accessed 8 July 2008); Amy Woolf, *Nuclear Arms Control: The U.S.- Russian Agenda*, (Washington, DC: Congressional Research Service, 2006), 3.

<sup>148</sup> Amy Woolf, *Nuclear Arms Control: The Strategic Offensive Reductions Treaty* (Washington, DC: Congressional Research Service, 2007), 14.

analysts judged that this staggering number of delivery platforms would have been beyond the economic resources of the country (partly due to START II's projected elimination of MIRVed ICBMs).<sup>149</sup>

In July 2001, even before the START I numbers were achieved, President Bush and President Putin met in Genoa, Italy, in conjunction with a G-8 summit meeting and discussed the future of nuclear force reductions. While Russia desired a formal agreement that would limit each side to 1,500 strategic nuclear warheads, President Bush stated that he desired a unilateral reductions arrangement whereby each side could determine the appropriate number of warheads needed on its own. The U.S. Senate gave its advice and consent to the ratification of the START II treaty on 26 January 1996, but the Russian Duma refused to approve the treaty's ratification until 14 April 2000. The Duma's resolution of ratification added conditions that the Russians knew were unacceptable to the United States, as noted earlier. This failure of the START II treaty prompted President Putin to affirm Russia's interest in legally binding constraints on the United States in another treaty.

In November 2001, after a Department of Defense review of the U.S. nuclear posture, President Bush restated his intention to reduce U.S. forces to between 1,700 and 2,200 "operationally deployed" strategic nuclear warheads over the next decade without a formal written agreement. President Putin restated that Russia planned to reduce the number of its warheads in this broad category to 1,500 but would prefer to use the formal arms control process to accomplish these goals.<sup>150</sup> When formal discussions began in January 2002, Russia proposed counting rules, elimination rules, and verification methods similar to those used in the START treaties. Such an elaborate agreement was exactly what the United States did not want and refused to conclude, but in the end, Russia obtained what it really desired: a legally binding treaty. It seems plausible that one of Russia's motives in seeking a legally binding treaty was prestige – appearing as the equal of the United States on the international stage.

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<sup>149</sup> Amy Woolf, *Nuclear Arms Control: The Strategic Offensive Reductions Treaty*, 14.

<sup>150</sup> *Ibid.*, 2.

According to the Moscow Treaty, by 31 December 2012 each side will have reduced its operationally deployed strategic nuclear arsenal to between 1,700 and 2,200 warheads.<sup>151</sup> With the planned phase out of the Delta III submarines, SS-18 ICBMs, and SS-19 ICBMs, this will be an appropriate amount of warheads for the Russian defense budget.

## **B. FINANCIAL FACTORS**

### **1. Defense Budget**

Since Putin's 2003 speech to the Federal Assembly, military reform has been underway, at a slow pace, but progress had been made. The focus has been on attempting to create a professional military, ensuring that the military is equipped with modern weaponry, and reworking military strategy for future potential conflicts. Russia is shifting away from the paradigm of world wars to localized conflicts. These reforms are not inexpensive, and the Russians have encountered major problems in accomplishing them. Although defense spending has dramatically increased over the Putin era, many reforms are continuing their struggle to receive adequate funding.

Isakova reports that the 2004 budget allocated 2.56% of GDP to the defense industry and that in 2006 defense expenditures increased 1.3 times the 2005 amount.<sup>152</sup> Other sources report differing numbers for the defense budget. The International Institute for Strategic Studies (IISS) estimated that Russian defense spending accounted for the following as a percentage of GDP: 4.23% in 2004, 3.72% in 2005, and 4.11% in 2006.<sup>153</sup> Julian Cooper, a Professor of Russian Economic Studies at the Centre for Russian and East European Studies of the University of Birmingham European Research Institute, analyzed the future budget published in Russia and found some differing results. He calculated, based on projected figures, that the 2007 defense budget dropped to 2.63% of GDP. While the 2008 projected budget increased slightly to 2.74%, projections for

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<sup>151</sup> The White House, "Strategic Offensive Reductions Treaty."

<sup>152</sup> Isakova, *Russian Defense Reform: Current Trends*, 40.

<sup>153</sup> International Institute for Strategic Studies, *The Military Balance 2008* (London: Routledge, 2008), 209.

subsequent years show the percentage lowering again to 2.66%.<sup>154</sup> While the percentages have not changed significantly, there are two main factors that minimize the differences. The first is that the IISS report states that “once inflation is factored in the actual rate of growth [in defense spending] has broadly matched growth in the economy at large.”<sup>155</sup>

The second factor is the classification of “defense expenditure.” Certain items such as military pensions and paramilitary forces were not classified under defense expenses and the funds were provided from other sources. In 2004 these “extras” accounted for almost 1.5% of the GDP.<sup>156</sup> Cooper also noted that the projected budget published in July 2007 for 2008-2010 included some major changes in classifications. He noted that the appendices relating to military and security issues were now classified as “top secret” and not available to many of the lawmakers approving the budget. This re-classification did not only affect military spending. Cooper noted that 58% of the specifics in the budget expenditure were not openly published.<sup>157</sup>

The secretive nature of the military also affects the allocation of funds. Alexei Arbatov, currently a scholar at the Carnegie Moscow Center but previously Deputy Chairman of the Duma’s Defense Committee, states that if the parliament and public were told about the technical problems in the armed forces and the “inadequacy of the state armaments program (which is top secret),” pressure could be provided in the right places to ensure that proper funding was available.<sup>158</sup> Since a significant portion of the proposed budget for 2008-2010 is classified, there is no way to ensure that proper funding is being pushed into vital areas.

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<sup>154</sup> Julian Cooper, “Military expenditure in the three-year federal budget of the Russian Federation, 2008–10,” <http://www.sipri.org/contents/milap/cooper2007>, (accessed 10 February 2008), 2.

<sup>155</sup> International Institute for Strategic Studies, *The Military Balance 2008*, 210.

<sup>156</sup> Isakova, *Russian Defense Reform: Current Trends*, 40.

<sup>157</sup> Cooper, “Military expenditure,” 2.

<sup>158</sup> Alexei Arbatov, “Military Reform: From Crisis to Stagnation,” in *The Russian Military: Power and Policy*, eds. Steven E. Miller and Dmitri Trenin, (Cambridge, Mass.: The MIT Press, 2004), 101.

While defense spending has more than doubled in nominal terms since 2003, one of the reasons for reform struggles may be that the priorities on spending are not properly aligned.<sup>159</sup> Over the last 5 years the percentage of defense rubles spent on research and development (R&D) and procurement versus personnel has been shifting away from the personnel. In the past the ratio had 70 percent of the money going to personnel, and in 2006 only 60% of the funds were allocated for personnel. The goal is to achieve a 50-50 ratio through 2010-2011.<sup>160</sup> Cooper states that, based on the projected budget for 2008-2010, R&D and procurement continue to be the top priorities and receive the majority of the defense budget.<sup>161</sup>

Arbatov stated in April 2008 that since the defense budget of the RF is “25 times smaller than that of the United States, and is even more meager as compared to the consolidated defense budget of all the NATO countries,” a conventional arms race with the United States would be an economic disaster that could undermine “the living standard of the population to such a degree that African poverty would look like prosperity.”<sup>162</sup> Arbatov proposed that, based on the published military doctrine, the pursuit of a strengthened nuclear force structure would be more beneficial. Based on the proposed budgets Arbatov’s recommendations appear to be consistent with the decisions by the political leadership of the RF in that the one area of the Russian defense budget not taking any cuts is the nuclear forces. In the 2007 budget, the nuclear forces received 12,099 billion rubles and each year these figures are projected to rise. By 2010, the amount of money that these forces receive will have more than doubled in nominal terms to 25,256 billion rubles. Cooper relates these increases to plans to develop and commission new land- and sea-based platforms in the upcoming years.<sup>163</sup> The focus of

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<sup>159</sup> International Institute for Strategic Studies., *The Military Balance 2007* (London: Routledge, 2007), 191; Isakova, *Russian Defense Reform: Current Trends*, 39.

<sup>160</sup> Isakova, *Russian Defense Reform: Current Trends*, 41.

<sup>161</sup> Cooper, “Military expenditure,” 4.

<sup>162</sup> *Warweb.ru*, “Call for Russian Strategic Nuclear Forces Build-Up” 16 April 2008, reported and translated by OpenSource.gov 16 April 2008, CEP20080417337005.

<sup>163</sup> *Warweb.ru*, “Call for Russian Strategic Nuclear Forces Build-Up.”

Russian spending is to maintain the nuclear triad, but with the majority of the money going to the land- and sea-based legs of the triad. Isakova stated in 2006 that the current program is projected to focus on these two legs of the triad until the 2015-2020 timeframe and that the nuclear forces have received 100% of the money that they have requested over the last several years.<sup>164</sup>

## **2. Financial Impediments**

While the numbers show that nuclear forces are receiving more money every year and appear to be a main priority of the Russian military, there are signs that show that the money is not being applied effectively in this area either. At the same time that more money is being poured into the development and procurement of new forces, the bases that house Russian SSBNs when they are not at sea are having significant maintenance and financial difficulties. One major problem facing the nuclear forces at their bases is the influx of organized crime. These criminals and the workers that supply them with materials are supplementing their income by dealing on the black market. Among the items being stolen are scrap metal for repairs and palladium for construction. However, the theft of uranium intended for the nuclear reactor has raised the greatest concern.<sup>165</sup>

One of the factors explaining these thefts may be the low pay of the military. The military is underpaid and short of junior officers. Pay raises have for the most part been outpaced by inflation. In real purchasing power the pay raises have been negligible. In addition to the poor pay, the military's lack of adequate housing obliges servicemen to pay out of pocket for their homes. These situations place the officers and servicemen under financial strain and may increase the risk of crime and corruption.<sup>166</sup>

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<sup>164</sup> Isakova, *Russian Defense Reform: Current Trends*, 31.

<sup>165</sup> Michael Jasinski. "The Military, the Regions, and Nuclear Weapons." In *Preventing Nuclear Meltdown: Managing Decentralization of Russia's Nuclear Complex*, edited by James Clay Moltz, Vladimir A. Orlov and Adam N. Stulberg (Burlington, VT: Ashgate Publishing Company, 2004), 98.

<sup>166</sup> Miller. "Introduction," 9; Aleksandr Golts, "The Social and Political Condition of the Russian Military," in *The Russian Military: Power and Policy*, eds. Steven E. Miller and Dmitri Trenin, (Cambridge, Mass.: The MIT Press, 2004), 79.



The Russian military has started to recognize this problem, and plans are in place to correct the deficiency. In 2007 the pay went up 10% on 1 January, and 15% on 1 December; and a new food ration was introduced to the servicemen. These three “raises” amount to a 30% increase in pay during 2007. As for the housing shortage, the military delivered 42,000 apartments for personnel. Plans for 2008 show no sign of slowing down in that the government intends to pursue new means of improving the standard of living for military personnel. Among the changes are new standards of food provisions, new contracts for permanent housing, a mortgage savings system, and another 15% pay raise for September 2008.<sup>167</sup>

Another indication of continuing shortcomings in financial support for the nuclear forces is the physical status of the bases. The bases do not have the financial means necessary to maintain their infrastructure. In several instances the bases do not even have the financial means required to continue their electric service. This situation is significant at all military installations, but even worse at nuclear facilities. A power failure at a base that services nuclear vessels may degrade the functioning of vital components that are necessary to ensure reactor safety. There have been several reports of near accidents with nuclear reactors due to power failure. Moreover, the loss of heat at one base was causing the liquid cooling in the nuclear reactors to freeze.<sup>168</sup>

The financial situation has deteriorated to such an extent in certain areas that neighboring towns informally adopted bases and their personnel. It was reported that at the end of 2003 crime, terrorist threats, and other physical and financial problems around Russia had created a situation in which the Saratov Oblast region was the only secure location for the military to deploy the new *Topol-M* ICBMs.<sup>169</sup> The military reportedly did not receive enough funding for these ICBMs and their personnel and had to rely on

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<sup>167</sup> IA Regnum, “Defense Ministry 2007 Summary of Achievements,” 3 January 2008, reported and translated by OpenSource.gov 3 January 2008, CEP2008103305001.

<sup>168</sup> Jasinski, “The Military, the Regions, and Nuclear Weapons,” 89; Cristina Chuen, “Nuclear Issues in the Far Eastern Federal Okrug.” In *Preventing Nuclear Meltdown: Managing Decentralization of Russia's Nuclear Complex*, edited by James Clay Moltz, Vladimir A. Orlov and Adam N. Stulberg (Burlington, VT: Ashgate Publishing Company, 2004), 123.

<sup>169</sup> Jasinski, “The Military, the Regions, and Nuclear Weapons,” 98.

the town of Saratov for support.<sup>170</sup> According to James Clay Moltz, "City governments have taken over critical supply functions for the Russian nuclear navy."<sup>171</sup>

This situation is dangerous in the current state of international terrorism. An extreme example was observed in 1998. A military base in Krasnoyarsk Kray had not received its funding and the personnel manning the base were not being paid. The governor of the region, fed up with the military's financial inadequacies, decided to threaten to assume control of all the nuclear weapons in the region until the problem was resolved.<sup>172</sup> The governor in question, Aleksandr Lebed, declared: "Officers of the Uzhur rocket formation have not received their allowances for five months and their wives are storming the headquarters. It is a serious formation and the officers are serious. And I am seriously thinking of establishing territorial jurisdiction over it. We in Krasnoyarsk are not rich yet, but in exchange for the status of a nuclear territory we could feed the formation and become a headache for the world community along with India and Pakistan."<sup>173</sup> While no physical action resulted from the threat, it shows the financial dilemma that the Russian government faced.

### **3. Financial Security**

The defense budget for 2008-2010 is based on an increasing GDP with a growth rate averaging about 6 percent a year through 2010. With the current high oil and gas prices and the seemingly insatiable global thirst for these energy resources, Russia is poised to become an even greater financial powerhouse. Can Russia maintain this economic performance in the coming years, or is it stretching what is sometimes referred

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<sup>170</sup> Olga Oliker and Tanya Charlick-Paley, *Assessing Russia's Decline : Trends and Implications for the United States and the U.S. Air Force* (Santa Monica, CA: RAND, 2002), 65.

<sup>171</sup> James Clay Moltz, "Introduction: Russia's Nuclear Regions." In *Preventing Nuclear Meltdown: Managing Decentralization of Russia's Nuclear Complex*, edited by James Clay Moltz, Vladimir A. Orlov and Adam N. Stulberg,(Burlington, VT: Ashgate Publishing Company, 2004), 3.

<sup>172</sup> Frank Umbach, *Future Military Reform: Russia's Nuclear & Conventional Forces* (Surrey, England:Conflict Studies Research Centre, 2002), 8.

<sup>173</sup> *Interfax* "Controversial Russian regional leader laments poor military funding" The British Broadcasting Corporation, BBC Monitoring International Reports Section: Former Soviet Union – Political, 24 July 1998.

to as a “virtual economy”?<sup>174</sup> Is Russia a petrostate that will be in distress if oil prices collapse or is its economy diverse enough to withstand an oil price drop?

The World Bank reports that from 1998 through 2006 the Russian GDP grew almost 60% and the poverty rate in the country was cut in half.<sup>175</sup> Even with these impressive improvements in the country’s financial performance, inflation has plagued the economy for the last decade. According to a report by the International Monetary Fund, “After an initial rapid decline from about 30 percent in 2000 to close to 10 percent in 2003, annual headline consumer price inflation became entrenched at 10–14 percent until early 2005.” In 2006 inflation in Russia was only down to 9.7%, which was the highest level in all Central and Eastern European countries.<sup>176</sup> The inflation rate settled at 7.8 percent in May 2007, and it is expected to stay around 7 percent through 2009.<sup>177</sup>

Even with this inflation rate, the International Monetary Fund (IMF) credits high oil prices and a better financial plan with assisting the massive growth in the Russian economy. In 2006, when oil prices reached approximately \$75 per barrel, the IMF reported, the sound fiscal plans of the Russian government would have had a balanced budget at \$30 per barrel.<sup>178</sup> Even with these successes, the IMF has been cautious about the future prospects of the Russian economy. According to the IMF, although there has been impressive growth in the economy, foreign investment in the country has been low. Moreover, the IMF noted, “capital and labor have accounted for less than half of the

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<sup>174</sup> Barry Ickes and Clifford Gaddy, “The Virtual Economy and Economic Recovery in Russia” [http://www.brookings.edu/articles/2001/05russia\\_gaddy.aspx](http://www.brookings.edu/articles/2001/05russia_gaddy.aspx), (accessed 4 February 2008).

<sup>175</sup> The World Bank, “Russia: Country Brief 2007,” <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/ECAEXT/RUSSIANFEDERATIONEXT/N/0,contentMDK:21054807~menuPK:517666~pagePK:1497618~piPK:217854~theSitePK:305600,00.html>, (accessed 15 February 2008).

<sup>176</sup> International Monetary Fund, “Russian Federation: Selected Issues,” IMF Country Report 07/352, October 2007, <http://www.imf.org/external/pubs/ft/scr/2007/cr07352.pdf>, (accessed 18 February 2008), 3.

<sup>177</sup> International Monetary Fund, “Russian Federation: 2007 Article IV Consultation—Staff Report; Staff Statement; and Public Information Notice on the Executive Board Discussion,” IMF Country Report 351, October 2007, <http://www.imf.org/external/pubs/ft/scr/2007/cr07351.pdf>, (accessed 18 February 2008), 9.

<sup>178</sup> *Ibid.*, 3.

increase in GDP since 2003.”<sup>179</sup> The projected GDP growth that the 3-year budget signed by President Putin in 2007 utilizes is consistent with the forecasts of the IMF.<sup>180</sup>

Although the IMF has indicated that the short-term prospect of the Russian economy is good, the IMF has stated that changes need to be made to ensure long term stability. The 2006 budget that was balanced based on a \$30 per barrel oil price is quickly being superseded. To accomplish the same budget balance in 2009, the oil prices will need to be at \$55-\$60 per barrel due to the inflation rate and the increased spending of the government.<sup>181</sup> As of June 2008 the price per barrel was approximately \$138, with no forecasts of significant decreases. This price will provide for a cash influx and an excellent buffer against any potential financial downturns. Although the government has estimated that the stabilization fund will be at 3.9 trillion rubles in 2009, this amount would not last long in the event of a collapse in oil prices in a country in which the annual expenditure in 2007 was close to 5.5 trillion rubles.<sup>182</sup>

In order to lessen its dependence on high oil prices, the Russian Federation has been reducing its reliance on oil as the prime source of income. In 2006, oil accounted for 11.2 percent of total revenues. This was reduced to 9 percent in 2007, and it is projected to be down to 7.2 percent in 2009.<sup>183</sup> In order to diversify the country’s exports, the Russian military-industrial sector has been a major supplier of arms and military equipment worldwide. The Congressional Research Service (CRS) has estimated that in 2006, Russian arms exports totaled approximately \$6.4 billion and that new contracts totaled approximately \$8.7 billion. This amounted to 21% of the global market and was

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<sup>179</sup> International Monetary Fund, “Russian Federation: 2007 Article IV Consultation—Staff Report; Staff Statement; and Public Information Notice on the Executive Board Discussion,” 3.

<sup>180</sup> *Ibid.*, 9.

<sup>181</sup> *Ibid.*, 17.

<sup>182</sup> RIA Novosti, “Russian president signs debut 3-year budget,” <http://en.rian.ru/russia/20070726/69726505.html> (accessed 6 January 2008); Cooper, “Military expenditure,” 6.

<sup>183</sup> International Monetary Fund, “Russian Federation: 2007 Article IV Consultation,” 10.

second only to the United States in arms exports.<sup>184</sup> While these figures fall far short of the amounts brought in by energy exports, diversification is essential to Russia's maintenance of its economic performance.

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<sup>184</sup> Congressional Research Service cited in International Institute for Strategic Studies, *The Russian Military 2008*, 210.

## V. CONCLUSION

Russia probably places more responsibility on its nuclear forces than any other country. Nuclear weapons are held in the highest regard and command respect on all sides of the political spectrum. In 2005, the Russian Orthodox Church named historic Russian Admiral Fyodor Ushakov the patron saint of the Russian bomber force.<sup>185</sup> At a time when the Russian conventional forces are struggling to regain their place in the world military ranking, nuclear forces constitute the backbone of Russian security.

In 1999-2000 the Russian government underwent significant political changes. Russian journalist Dmitriy Yevstafyev wrote in March 2000 that “parliamentary elections only confirmed once and for all that a consensus has formed in the country to the effect that a tougher policy has to be followed toward the West in order to elevate the status of the state and its citizens.”<sup>186</sup> He added that part of this consensus was that the nuclear forces were vital to ensure Russian global influence and that “they are the guarantee against pressure on us from NATO.”<sup>187</sup>

In recent years, the military has been conducting operations that simulate nuclear attacks in response to supposed NATO encroachment and invasion.<sup>188</sup> In 2004, retired General Makhmut Gareyev, president of the Academy of Military Sciences in Moscow, said, “In the current situation, the role of nuclear weapons for Russia is hard to

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<sup>185</sup> Agence France-Presse, “Russian Admiral Named Patron Saint Of Nuclear Bomber Force,” 26 September 2005, [http://www.terradaily.com/reports/Russian\\_Admiral\\_Named\\_Patron\\_Saint\\_Of\\_Nuclear\\_Bomber\\_Force.html](http://www.terradaily.com/reports/Russian_Admiral_Named_Patron_Saint_Of_Nuclear_Bomber_Force.html) (accessed 6 June 2008).

<sup>186</sup> Dmitriy Yevstafyev, “Putin’s Position on Arms Control, Disarmament as Derived From Public Statements, Actions in Previous Posts,” *Yadernyy Kontrol*, March-April 2000., reported and translated by OpenSource.gov CEP20000529000001.

<sup>187</sup> *Ibid.*

<sup>188</sup> Mark Schneider, *The Nuclear Forces and Doctrine of the Russian Federation*, (Washington, D.C.: National Institute Press, 2006), 9; Nikolai Sokov, “Chronology of Significant Military Maneuvers,” August 2004, <http://www.nti.org/db/nisprofs/russia/weapons/maneuver.htm> (accessed 20 July 2008).

overestimate. Basically it is the only factor which can still ensure our country's safety. We have nothing else to repel strategic military threats anymore.”<sup>189</sup>

The problem is that the Russian goals may exceed the country's capabilities. Mark Schneider, a senior analyst with the National Institute for Public Policy, has pointed out that the nuclear program under the Yeltsin regime was based on new technology and that improved systems were to be produced every 10 years. However, the country could not support this financially, and as of 2000 many systems had exceeded their planned service lives and had to be replaced.<sup>190</sup> While the Russian military budget has been substantially increased in recent years due to massive oil price increases, it takes time to revitalize the nuclear forces. Due to delays in modernization, more nuclear assets are being decommissioned than are being deployed. In 2003 Aleksey Arbatov, head of the Russian Academy of Sciences Center for International Security, stated that the Moscow Treaty would not limit the number of operationally deployed strategic nuclear weapons for Russia as the country would be financially limited to fewer weapons than the ceiling prescribed by the treaty.<sup>191</sup> In 2012, when the treaty expires, Russia will not have commissioned enough new weapons to compensate for the loss of older weapons.

The current START I data indicate that the Russian Federation has 4,147 nuclear warheads deployed on 848 launchers or bombers. This is almost double the Moscow Treaty allowable ceiling of 2,200 warheads by 31 December 2012. As discussed in Chapters II and III, these numbers are declining rapidly:

- 732 warheads attributed to the SS-19 (*Stiletto*) ICBM force are expected to be retired no later than 2009.
- The 23 year life extension of the SS-25 (*Topol*) ICBM force and its 201 warheads will start to expire in 2011.
- The 512 warheads associated with the Tu-95MS (*Bear*) bombers will start to be decommissioned in 2010.

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<sup>189</sup> Gareyev quoted in David Holley, “Russia Seeks Safety in Nuclear Arms” *Los Angeles Times*, 6 December 2004, <http://fairuse.1accesshost.com/news2/latimes427.htm> (accessed 8 June 2008).

<sup>190</sup> Schneider, *The Nuclear Forces and Doctrine of the Russian Federation*, 14.

<sup>191</sup> *Moscow Vremya Novostey* “Russian Stability Expert Arbatov Sees UN Security Council Authority Enhanced” 20 March 2003, reported and translated by OpenSource.gov 20 March 2003, CEP20030320000410.

- The 288 warheads associated with the Project 667BDR (*Delta III*) submarines are expected to be decommissioned shortly.

Current military plans envisage the annual production of six or seven *Topol-M* ICBMs, and one or two *Blackjack* bombers as well as the completion of three Project 955 (*Borey*) submarines. By the year 2015, with no changes to the plan, this would give the Russian Federation approximately 600 warheads attributed to SLBMs (30%); 1,143 warheads attributed to ICBMs (58%); and 240 warheads attributed to ALCMs (12%) for a total warhead count of 1,983.<sup>192</sup> This shows that since Arbatov's statement in 2003 changes have been made to the production rate of certain nuclear forces and the Russian Federation has renewed its efforts to maintain its nuclear posture. While Arbatov appears to have been incorrect in his forecast about the financial strain on the Russian defense budget, if it were not for the ceilings codified in the Moscow Treaty, the Russian Federation might have been substantially outnumbered by the United States in numbers of operationally deployed strategic nuclear warheads.<sup>193</sup>

As stated in Chapter III, since the 1960s the ICBMs have been the dominant nuclear force in Russia. These missiles provide a cost effective method of maintaining global military might, meet the requirements of localized nuclear command and control, and uphold the country's superpower status. As long as Russia maintains intercontinental-range nuclear forces, the ICBMs will probably carry the majority of the warhead inventory in this range category. In the battle for survival, the SLBMs and ALCMs are the most likely potential losers.

When the two platforms – submarines and aircraft - are compared, it is difficult to determine which would be the better option to complement the ICBMs for the future of the intercontinental-range nuclear forces in the Russian Federation. With no public

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<sup>192</sup> This projection is based on the following assumptions: all Project 667BDR (*Delta III*) submarines decommissioned, the Project 941 (*Typhoon*) decommissioned, three Project 955 (*Borey*) submarines commissioned, all SS-19 (*Stiletto*) and SS-25 (*Topol*) ICBMs decommissioned, seven SS-27 (*Topol-M*) ICBMs per year commissioned, no RS-24 ICBMs commissioned, all Tu-95MS (*Bear*) decommissioned, and a total of 30 Tu-160 (*Blackjack*) aircraft in 2015.

<sup>193</sup> It is worth recalling that the Moscow Treaty ceilings consist of a restatement of the plans announced by the United States in the 2001 Nuclear Posture Review.



statements declaring an intention to phase out either platform, and new bombers and submarines being built, there is no indication that either will be discontinued. It will nonetheless be necessary for the military leaders of both the SSBNs and bomber aircraft to fight for their respective force's survival.

The strategic bomber forces are being phased to consist only of Tu-160 (*Blackjack*) aircraft. The fleet currently consists of 15 aircraft with 1 or 2 additional produced per year. The continuation of this plan depends on the ability of the government to ensure that the defense budget is supplied with the requisite funding. If the Russian Federation experiences another collapse of the financial sector, as was seen in 1998, the military budget could drop significantly and the government might abandon new aircraft production.

The same can be said for the production of the new SSBNs. As discussed in Chapter II, there are only three Project 955 (*Borey*) class submarines in construction. These submarines have been under construction since 1996, and as of July 2008 none has completed sea trials. This is partly due to the delays in the development and production of the *Bulava* missile, which is not expected to be ready for operational deployment until 2009. These submarines were also delayed significantly during the financial crisis of 1998 when construction of the *Yuri Dolguruky* was halted due to lack of funding.

Fortunately for the SSBNs and strategic bombers, as discussed in Chapter IV, there currently is no money shortage; and with the continued global demand for oil, it appears that no shortage is on the horizon. The Russian Federation appears to have learned from its mistakes in the late 1990s, and it has started to accumulate massive reserve funds that might (if sufficient funds were reserved) carry it through a crisis.

In addition to the financial capability to maintain the nuclear forces, the essential political support is also present. The previous Russian President and current Prime Minister, Vladimir Putin, has openly supported the nuclear forces and stated that they are necessary to ensure the security and sovereignty of Russia. The new Russian president, Dmitri Medvedev, has made no public announcements that would change the stance of the previous administration nor alter the Russian military doctrine of 2000.

Although current construction plans do not shed a kind light on the future of the SSBN force, Russia's leaders apparently regard these strategic weapons as indispensable elements of a strong deterrent force that is needed to compensate for the poor condition of the country's conventional forces. The SSBN's advantages, such as survivability through stealth and payload capability, will continue to overshadow the disadvantages. With the current financial stability of the Russian economy and the prospects of continuing high oil prices the main disadvantage – cost – will no longer be as significant.

It appears that the SSBN force is shrinking to a radically minimal level with the few operational submarines that remain and the even fewer in construction. Given the fact that the Russians have been engaged in constructing and operating SSBNs for over 50 years, they probably have a plan that has not yet been made public. Once they resolve the current developmental problems with the *Bulava* sea-launched ballistic missile, it is entirely plausible that they may undertake massive construction efforts comparable in some ways to Cold War production patterns. While the Russian military may decide to restructure the nuclear forces, the SSBN force will probably continue to be a prominent component of these forces for many years to come.

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## LIST OF REFERENCES

- Agence France-Presse. "Russian Admiral Named Patron Saint of Nuclear Bomber Force," 26 September 2005, [http://www.terraily.com/reports/Russian\\_Admiral\\_Named\\_Patron\\_Saint\\_of\\_Nuclear\\_Bomber\\_Force.html](http://www.terraily.com/reports/Russian_Admiral_Named_Patron_Saint_of_Nuclear_Bomber_Force.html) (accessed 6 June 2008).
- Agentstvo Voyennykh Novostey. "Bryansk Nuclear Sub Returning to Northern Fleet" 17 January 2008, reported and translated by OpenSource.gov, 17 January 2008, CEP20080117950152.
- . "Russia Test-launches Topol ICBM from Plesetsk Space Center" 18 October 2007, reported and translated by OpenSource.gov 18 October 2007, CEP20071018950024.
- . "Duma Ratifies Agreement on Exploitation of Missile Complex with Ukraine" 25 January 2008, reported and translated by OpenSource.gov 25 January 2008, CEP20080125950193.
- . "MIRV ICBM Could Enter Duty in Three Years" 25 October 2007, reported and translated by OpenSource.gov 25 October 2007, CEP20071025950224.
- Arbatov, Alexei. "Military Reform: From Crisis to Stagnation," in *The Russian Military: Power and Policy*, eds. Steven E. Miller and Dmitri Trenin, Cambridge, Mass. The MIT Press, 2004.
- Baev, Pavel. "Russia's Military - the Best Case," Janes. [http://www8.janes.com/Search/documentView.do?docId=/content1/janesdata/srep/srep090/s0900006.htm@current&pageSelected=allJanes&keyword=Russia\\*%20Nuclear&backPath=http://search.janes.com/Search&Prod\\_Name=SREP090&#Ref4](http://www8.janes.com/Search/documentView.do?docId=/content1/janesdata/srep/srep090/s0900006.htm@current&pageSelected=allJanes&keyword=Russia*%20Nuclear&backPath=http://search.janes.com/Search&Prod_Name=SREP090&#Ref4) (accessed 11 October 2007).
- Barabanov, Mikhail. "The Future of Russia's Strategic Fleet." Moscow Defense Brief Journal, <http://mdb.cast.ru/mdb/1-2004/raf/tfotrsf/> (accessed 24 October 2007).
- Barrie, Douglas. "Strategic Ambitions." *Aviation Week & Space Technology* 162, no. 2 (10 January 2005).
- Barrie, Douglas and Alexey Komarov. "Strategic Target Russian Air Force's Nuclear Role is Bolstered as Defense Doctrine is Unveiled." *Aviation Week & Space Technology* 159, no. 15 (13 October 2003).
- Berman, Robert P. and John C. Baker. *Soviet Strategic Forces: Requirements and Responses*, Washington, D.C.: The Brookings Institution, 1982.

- Bernier, Justin. "The Death of Disarmament in Russia?" *Parameters* 34, no. 2 (Summer, 2004).
- Blank, Stephen. "Russia's Foreign Policy: The Worst Case." [http://www8.janes.com/Search/documentView.do?docId=/content1/janesdata/srep/srep090/s0900010.htm@current&pageSelected=allJanes&keyword=Russia\\*%20Nuclear&backPath=http://search.janes.com/Search&Prod\\_Name=SREP090&](http://www8.janes.com/Search/documentView.do?docId=/content1/janesdata/srep/srep090/s0900010.htm@current&pageSelected=allJanes&keyword=Russia*%20Nuclear&backPath=http://search.janes.com/Search&Prod_Name=SREP090&) (accessed 24 October 2007).
- . *Russia's Armed Forces on the Brink of Reform*. Carlisle, PA: Strategic Studies Institute, 1998.
- Boese, Wade. "Russian Nuclear Ambitions Exceed Reality." *Arms Control Today* 36, no. 1 (Jan/Feb, 2006).
- Cheney, Dick. *Annual Report to the President and Congress*. Washington, DC: Government Printing Office, 1991.
- Chuen, Cristina. "Nuclear Issues in the Far Eastern Federal Okrug" In *Preventing Nuclear Meltdown: Managing Decentralization of Russia's Nuclear Complex*, edited by James Clay Moltz, Vladimir A. Orlov and Adam N. Stulberg, Burlington, VT: Ashgate Publishing Company, 2004.
- Cooper, Julian. "Military expenditure in the three-year federal budget of the Russian Federation, 2008–10," <http://www.sipri.org/contents/milap/cooper2007>, (accessed 10 February 2008).
- Diakov, A. S. "Nuclear Arms Reduction: The Process and Problems." <http://www.armscontrol.ru/rus/reductions/main.htm> (accessed 17 October 2007).
- Diakov, Anatoli and Eugene Miasnikov. "ReSTART: The Need for a New U.S.-Russian Strategic Arms Agreement." *Arms Control Today* 36, no. 7 (September 2006): 6.
- Dick, Charles J. "Russia's New Doctrine takes dark world view," *Jane's Intelligence Review* January (2000): 14-19.
- Federation of American Scientists, "SALT I Interim Agreement," <http://www.fas.org/nuke/control/salt1/text/salt1.htm> (accessed 31 January 2008).
- . "National Security Concept of the Russian Federation." <http://www.fas.org/nuke/guide/russia/doctrine/gazeta012400.htm>, (accessed 8 July, 2008).
- Feickert, Andrew. *Missile Survey: Ballistic and Cruise Missiles of Selected Foreign Countries*. Washington, DC: Congressional Research Service, 2005.

- Forum, "Russia: Strategic Nuclear Forces Activity Said to Be Nothing But 'PR,'" 17 December 2007, reported and translated by OpenSource.gov, 17 December 2007, CEP20071217009005.
- . "Russia Seen Facing Total Lack of Nuclear-Armed Submarines," 5 December 2007, reported and translated by OpenSource.gov, 5 December 2007, CEP20071206009001.
- Gerber, Theodore and Sarah Mendelson. "Strong Public Support for Military Reform in Russia," *PONARS*, Policy memo 288 (2003).
- GlobalSecurity.org, "Project 935 / Project 955 Borei," <http://www.globalsecurity.org/wmd/world/russia/935.htm>, (accessed 31 January 2008).
- Golts, Aleksandr. "The Social and Political Condition of the Russian Military," in *The Russian Military: Power and Policy*, eds. Steven E. Miller and Dmitri Trenin, Cambridge, Mass.: The MIT Press, 2004.
- Gottemoeller, Rose. "Nuclear Weapons in Current Russian Policy" In *The Russian Military: Power and Policy*, edited by Steven Miller and Dmitri Trenin, 183. Cambridge, Massachusetts: The MIT Press, 2004.
- Holley, David. "Russia Seeks Safety in Nuclear Arms" *Los Angeles Times*, 6 December 2004, <http://fairuse.1accesshost.com/news2/latimes427.htm> (accessed 8 June 2008).
- International Institute for Strategic Studies. *The Military Balance 2008*, London: Routledge, 2008.
- . *The Military Balance 2007*, London: Routledge, 2007.
- IA Regnum. "Defense Ministry 2007 Summary of Achievements," 3 January 2008, reported and translated by OpenSource.gov 3 January 2008, CEP2008103305001.
- Ickes, Barry and Gaddy, Clifford. "The Virtual Economy and Economic Recovery in Russia," [http://www.brookings.edu/articles/2001/05russia\\_gaddy.aspx](http://www.brookings.edu/articles/2001/05russia_gaddy.aspx) (accessed 24 October 2007).
- Information Agency of Tatarstan. "Gorbunov aircraft plant tests new Tu-160" January 9, 2008, <http://www.eng.tatar-inform.ru/news/2008/01/09/10685/>, (accessed 3 February 2008).
- Interfax. "Controversial Russian regional leader laments poor military funding" The British Broadcasting Corporation, BBC Monitoring International Reports Section: Former Soviet Union – Political, 24 July 1998.

International Monetary Fund. "Russian Federation: Selected Issues," IMF Country Report 07/352, October 2007, <http://www.imf.org/external/pubs/ft/scr/2007/cr07352.pdf>, (accessed 18 February 2008).

———. "Russian Federation: 2007 Article IV Consultation—Staff Report; Staff Statement; and Public Information Notice on the Executive Board Discussion," IMF Country Report 351, October 2007, <http://www.imf.org/external/pubs/ft/scr/2007/cr07351.pdf>, (accessed 18 February 2008).

Isakova, Irina. *Russian Defense Reform: Current Trends*. Carlisle, PA: Strategic Studies Institute, 2006.

ITAR-TASS. "RF Navy to Get Yuri Dolgoruky Submarine in 2008 - Dep DM (Adds)," 22 December 2007, reported and translated by OpenSource.gov, 17 December 2007, CEP20071222950108.

———. "Number of Russian Submarine Sorties Declines 20 Percent (Adds)," 20 January 2008, reported and translated by OpenSource.gov, 30 January 2008, CEP20080130950379.

———. "Russian Topol ICBM missile destroys target in northern range" 18 October 2007, reported and translated by OpenSource.gov 18 October 2007, CEP20071018950052.

Izvestiya. "Engels Tu-95MS Aircraft Commander Describes Long Range Aviation Combat Patrols" 21 December 2007, reported and translated by OpenSource.gov 21 December 2007, CEP20071221021002.

———. "Moscow Puts Latest Russian Missile Tests in 'Political Context'" 18 December 2007, reported and translated by OpenSource.gov 18 December 2007, CEP20071218021007.

Jane's. "Jane's Defence Budget: Russian Federation," [www.jdm.janes.com](http://www.jdm.janes.com) (accessed 10 October 2007).

———. "NBC Capabilities: Russian Federation," [http://www8.janes.com/Search/documentView.do?docId=/content1/janesdata/yb/jNBC/jNBC0074.htm@current&pageSelected=allJanes&keyword=Russia\\*%20Nuclear&backPath=http://search.janes.com/Search&Prod\\_Name=JNBC&](http://www8.janes.com/Search/documentView.do?docId=/content1/janesdata/yb/jNBC/jNBC0074.htm@current&pageSelected=allJanes&keyword=Russia*%20Nuclear&backPath=http://search.janes.com/Search&Prod_Name=JNBC&) (accessed 24 October 2007).

———. "Nuclear Weapons and their Effect," [http://www8.janes.com/Search/documentView.do?docId=/content1/janesdata/yb/jNBC/jNBC0099.htm@current&pageSelected=allJanes&keyword=Russia\\*%20Nuclear&backPath=http://search.janes.com/Search&Prod\\_Name=JNBC&](http://www8.janes.com/Search/documentView.do?docId=/content1/janesdata/yb/jNBC/jNBC0099.htm@current&pageSelected=allJanes&keyword=Russia*%20Nuclear&backPath=http://search.janes.com/Search&Prod_Name=JNBC&) (accessed 24 October 2007).

- . "Submarine Forces, Russian Federation," [http://www8.janes.com/Search/documentView.do?docId=/content1/janesdata/yb/juws/juws2170.htm@current&pageSelected=allJanes&keyword=bulava&backPath=http://search.janes.com/Search&Prod\\_Name=JUWS&](http://www8.janes.com/Search/documentView.do?docId=/content1/janesdata/yb/juws/juws2170.htm@current&pageSelected=allJanes&keyword=bulava&backPath=http://search.janes.com/Search&Prod_Name=JUWS&), (accessed 31 January 2008).
- . "World Navies: Russian Federation." <http://jmsa.janes.com> (accessed 17 October 2007).
- Jasani, Bhupendra. "Satellite Monitoring – Programmes and Prospects" in *Satellites for Arms Control and Crisis Monitoring*, ed. Bhupendra Jasani and Toshibomi Sakata, New York: Oxford University Press, 1987.
- Jasinski, Michael. "The Military, the Regions, and Nuclear Weapons." In *Preventing Nuclear Meltdown: Managing Decentralization of Russia's Nuclear Complex*, edited by James Clay Moltz, Vladimir A. Orlov and Adam N. Stulberg, 79. Burlington, VT: Ashgate Publishing Company, 2004.
- Jasinski, Michael and Victor Mizin. "Russian Strategic Aviation: In Search of Mission." *Journal of Slavic Military Studies* 17, no. 2 (Apr/Jun, 2004).
- Kasarin, Vasilii. "Retribution Will be Inevitable." *Oborona.ru*, 7 April 2006, <http://www.oborona.ru/article/?id=2001196&category=3526> (accessed 8 October 2007).
- Korobushin, V. "Russia's Strategic Deterrence: Security Functions and Development Prospects." *Military Thought* 14, no. 3 (2005).
- Lieber, Keir A. and Daryl G. Press. "The Rise of U.S. Nuclear Primacy." *Foreign Affairs* 85, no. 2 (Mar/Apr, 2006).
- Miasnikov, Eugene. "Collision of Two U.S. Nuclear Powered Submarines on March 19, 1998." <http://www.armscontrol.ru/subs/collisions/comm0319.htm> (accessed 24 October 2007).
- . "The Future of Russia's Strategic Nuclear Forces: Discussions and Arguments." <http://www.fas.org/spp/eprint/snf0322.htm> (accessed 11 October 2007).
- . "Future of Russia's Sea Based Strategic Forces." <http://www.armscontrol.ru/subs/snf/rus/sea0215.htm> (accessed 17 October 2007).
- . "Find and Destroy." *Nezavisimaya Gazeta* (25 October 1994): 4, <http://www.armscontrol.ru/subs/detection/rus/ng102594.htm>.



- . “Estimates of submarine detection ranges,” <http://www.fas.org/spp/eprint/snf03222.htm>, (accessed 17 October 2007).
- Miller, Steven E. “Introduction” in *The Russian Military: Power and Policy*, edited by Steven E. Miller and Dmitri Trenin, Cambridge, Mass.: The MIT Press, 2004.
- MissileThreat.com. “MissileThreat: SS-N-21,” Claremont Institute, [http://www.missilethreat.com/cruise/id.100/cruise\\_detail.asp](http://www.missilethreat.com/cruise/id.100/cruise_detail.asp), (accessed 26 April 2008).
- Moltz, James Clay. "Introduction: Russia's Nuclear Regions." In *Preventing Nuclear Meltdown: Managing Decentralization of Russia's Nuclear Complex*, edited by James Clay Moltz, Vladimir A. Orlov and Adam N. Stulberg, 1. Burlington, VT: Ashgate Publishing Company, 2004.
- Nezavisimaya Gazeta. “Russia: More on 26 Dec RS24 ICBM Launches; Experts say Missiles ‘Not New Design’” 27 December 2007, reported and translated by OpenSource.gov 27 December 2007, CEP20071227009012.
- Nezavisimoye Voyennoye Obozreniye “Development of Navy Strategic Forces Eyed,” 11 December 1998, reported and translated by OpenSource.gov, 11 December 1998, FTS19981217000130.
- . “Russia: Expert Backs Tried, Tested Sineva Technology Over Failing Bulava,” 25 January 2008, reported and translated by OpenSource.gov, 25 January 2008, CEP20080125548013.
- . “Adm Yerofeyev on Value of Submarine Based Nuclear Forces,” 14 March 1996, reported and translated by OpenSource.gov, 14 March 1996, FTS19960314000766.
- Norris, Robert S. and Hans M. Kristensen. “Russian Nuclear Forces, 2008,” *Bulletin of the Atomic Scientists*, 84, no. 2 (May/June 2008), 54-57.
- Novichkov, Nikolai. "Interview with Admiral of the Fleet Vladimir Kuroyedov: Commander in Chief, Russian Federation Navy." [www.Janes-Defense-Weekly.com](http://www.Janes-Defense-Weekly.com) (accessed 7 October 2007).
- Odom, William E. *The Collapse of the Soviet Military*, New Haven, CT: Yale University Press, 1998.
- Oliker, Olga and Tanya Charlick-Paley. *Assessing Russia's Decline : Trends and Implications for the United States and the U.S. Air Force*. Santa Monica, CA: RAND, 2002.
- Osipovich, Alexander. "President Criticizes Iraq War, 'Erotica'." *The Moscow Times*, 19 October 2007, <http://www.themoscowtimes.com/stories/2007/10/19/002.html>.

- Podvig, Pavel. "Russian Strategic Forces in the Next Decade."  
<http://russianforces.org/podvig/eng/publications/forces/20050100asp.shtml>  
(accessed 24 October 2007).
- . *Russian Strategic Nuclear Forces*. Cambridge, Massachusetts: The MIT Press, 2001.
- . "Russian Strategic Forces: Strategic Fleet." <http://russianforces.org/navy/>  
(accessed 24 October 2007).
- . "Project 667BDR submarines are staying?"  
[http://russianforces.org/blog/2007/09/project\\_667bdr\\_submarines\\_are.shtml](http://russianforces.org/blog/2007/09/project_667bdr_submarines_are.shtml),  
(accessed 29 January 2008).
- . "Bryansk submarine is back from overhaul"  
[http://russianforces.org/blog/2008/01/bryansk\\_submarine\\_is\\_back\\_from.shtml](http://russianforces.org/blog/2008/01/bryansk_submarine_is_back_from.shtml),  
(accessed 29 January 2008).
- . "Bulava test history,"  
[http://russianforces.org/blog/2007/11/bulava\\_test\\_history.shtml](http://russianforces.org/blog/2007/11/bulava_test_history.shtml), (accessed 31  
January 2008).
- . "Russian Forces at the end of 2007,"  
[http://russianforces.org/blog/2007/12/russian\\_forces\\_at\\_the\\_end\\_of\\_2.shtml](http://russianforces.org/blog/2007/12/russian_forces_at_the_end_of_2.shtml),  
(accessed 31 January 2008).
- . "Project 667BRDM submarines and Sineva missiles,"  
[http://russianforces.org/blog/2008/04/project\\_667brdm\\_submarines\\_and.shtml#co  
mments](http://russianforces.org/blog/2008/04/project_667brdm_submarines_and.shtml#comments) (accessed 1 April 2008).
- . "Strategic Aviation," <http://russianforces.org/aviation/>, (accessed 6 February  
2008).
- . "Current Status," <http://russianforces.org/current/>, (accessed 4 February 2008).
- . "Post-START differences,"  
[http://russianforces.org/blog/2008/05/poststart\\_differences.shtml](http://russianforces.org/blog/2008/05/poststart_differences.shtml), (accessed 3  
June 2008).
- Polmar, Norman. "Strike from the Sea." *United States Naval Institute Proceedings* 132,  
no. 6 (Jun, 2006).
- President of Russia Web Portal. "President Vladimir Putin met with the personnel of the  
Russian Federal Nuclear Centre"  
<http://www.kremlin.ru/eng/text/news/2003/07/159419.shtml> (accessed 13  
February 2008).

- Putin, Vladimir. "2006 Annual Address to the Federal Assembly," [http://www.kremlin.ru/eng/speeches/2006/05/10/1823\\_type70029type82912\\_105566.shtml](http://www.kremlin.ru/eng/speeches/2006/05/10/1823_type70029type82912_105566.shtml) (accessed 10 October 2007).
- . "2001 Annual Address to the Federal Assembly," [http://www.kremlin.ru/eng/speeches/2001/04/03/0000\\_type70029type82912\\_70660.shtml](http://www.kremlin.ru/eng/speeches/2001/04/03/0000_type70029type82912_70660.shtml), (accessed 13 February 2008).
- . "2003 Annual Address to the Federal Assembly," [http://www.kremlin.ru/eng/speeches/2003/05/16/0000\\_type70029type82912\\_44692.shtml](http://www.kremlin.ru/eng/speeches/2003/05/16/0000_type70029type82912_44692.shtml) (accessed 13 February 2008).
- . "Opening Address at Meeting on Developing Russia's Nuclear Weapons Complex" [http://www.kremlin.ru/eng/text/speeches/2006/03/30/2300\\_type82912type82913\\_104010.shtml](http://www.kremlin.ru/eng/text/speeches/2006/03/30/2300_type82912type82913_104010.shtml) (accessed 10 February 2008).
- . "The push for a new arms control agreement with Russia is ill-conceived" [http://russianforces.org/blog/2008/06/the\\_push\\_for\\_a\\_new\\_arms\\_control.shtml](http://russianforces.org/blog/2008/06/the_push_for_a_new_arms_control.shtml), (accessed 3 June 2008).
- Reuters. "Putin reacts to NATO 'muscle-flexing,'" *Reuters*, 20 November 2007.
- RIA Novosti. "Russian President Signs Debut 3-Year Budget." *Russian News and Information Agency*, 26 July 2007. <http://en.rian.ru/russia/20070726/69726505.html> (accessed 24 October 2007).
- . "Russian president signs debut 3-year budget," <http://en.rian.ru/russia/20070726/69726505.html> (accessed 6 January 2008).
- . "Russia's RS-24 ICBM to enter service in 2009 - SMF commander," 27 February 2008, <http://en.rian.ru/russia/20080227/100186909.html> (accessed 24 July 2008).
- Schneider, Mark. *The Nuclear Forces and Doctrine of the Russian Federation*, Washington, D.C.: National Institute Press, 2006.
- Scott, Harriet Fast and William F. Scott. *The Armed Forces of the USSR*, Boulder, CO: Westview Press, 1984.
- Sokov, Nikolai. "The Origins of and Prospects for Nuclear Doctrine." *Nonproliferation Review* 14, no. 2 (July 2007).
- . *Russian Strategic Modernization: The Past and Future*. Lanham, MD: Rowman & Littlefield Publishers, Inc, 2000.

- . “Modernization of Strategic Nuclear Weapons in Russia: The Emerging New Posture,” May 1998, <http://www.nti.org/db/nisprofs/over/modern.htm>, (accessed 18 October 2007).
- . “Chronology of Significant Military Maneuvers,” August 2004, <http://www.nti.org/db/nisprofs/russia/weapons/maneuver.htm> (accessed 20 July 2008).
- The White House, “Strategic Offensive Reductions Treaty” <http://www.whitehouse.gov/news/releases/2002/05/20020524-3.html>, (accessed 8 July 2008).
- The World Bank. “Russia: Country Brief 2007,” <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/ECAEXT/RUSSIANFEDERATIONEXTN/0,,contentMDK:21054807~menuPK:517666~pagePK:1497618~piPK:217854~theSitePK:305600,00.html>, (accessed 15 February 2008).
- Tolz, Vera. “Politicians’ Conceptions of the Russian Nation” in *Contemporary Russian Politics: A Reader*, edited by Archie Brown, New York: Oxford University Press, 2001.
- Umbach, Frank. *Future Military Reform: Russia’s Nuclear & Conventional Forces* Surrey, England: Conflict Studies Research Centre, 2002.
- United States, Cong. Senate. Foreign Relations Committee. *Treaty Doc. 110-7, Treaty Between the Governments of the United States of America and the United Kingdom Concerning Defense Trade Cooperation and Treaty Doc. 110-10, Treaty Between the Governments of the United States of America and Australia Concerning Defense Trade Cooperation*, Federal News Service, 21 May 2008.
- U.S. Department of State, “Moscow Treaty,” <http://www.state.gov/t/ac/trt/18016.htm>, (accessed 29 January 2008).
- . “Hypertext of START I Treaty,” <http://www.state.gov/www/global/arms/starthtm/start/start1.html>, (accessed 3 February 2008).
- . “START Aggregate Numbers of Strategic Offensive Arms,” <http://www.state.gov/t/vci/rls/prsrl/2008/102844.htm>, (accessed 20 April 2008)
- . “Strategic Arms Limitation Talks (SALT I),” <http://www.state.gov/www/global/arms/treaties/salt1.html> (accessed 11 June 2008).

- Wallander, Celeste A. "Russia's National Security Policy in 2000," *PONARS, Policy Memo* 102 (2000).
- Warweb.ru*, "Call for Russian Strategic Nuclear Forces Build-Up" 16 April 2008, reported and translated by *OpenSource.gov* 16 April 2008, CEP20080417337005.
- Woolf, Amy. *Nuclear Arms Control: The U.S.-Russian Agenda*. Washington, DC: Congressional Research Service, 2006.
- . *Arms Control After START II: Next Steps in US Russian Agenda*. Washington, DC: Congressional Research Service, 2001.
- . *Nuclear Arms Control: The Strategic Offensive Reductions Treaty*, Washington, DC: Congressional Research Service, 2007.
- Yarynich, Valery. *C3: Nuclear Command, Control Cooperation*, Washington D.C.: Center for Defense Information, 2003.
- Yost, David S. *Soviet Ballistic Missile Defense and the Western Alliance*, Cambridge, MA: Harvard University Press, 1988.

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