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SCIENCE AND TECHNOLOGY COMMITTEE

RUSSIAN MILITARY MODERNIZATION

GENERAL REPORT

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I. INTRODUCTION

1. In 1994, Russia signed the Budapest Memorandum, pledging “to respect the independence and sovereignty and the existing borders of Ukraine” and “to refrain from the threat or use of force against the territorial integrity”. In return for these security assurances, Ukraine gave up the world’s third largest nuclear weapons stockpile. This agreement was reinforced by the 1997 Treaty of Friendship, Cooperation and Partnership between Ukraine and Russia, where the countries agreed to “respect each other’s territorial integrity, and confirm the inviolability of the borders existing between them.” Twenty years later, Russia invaded parts of Ukraine in mere days. Today, it continues its military aggression in eastern and south-eastern Ukraine. As a consequence of these Russian actions, the world’s attention has focused on the new-found prowess of its military. Over recent months, NATO and its partner states have seen several tests of its new nuclear-capable Bulava missiles; large-scale exercises close to their borders; high-risk incidents involving Russian naval and air assets; and destabilizing nuclear rhetoric, including an open nuclear threat against Denmark if the country joins NATO’s ballistic missile defence system. This General Report of the Science and Technology Committee (STC) of the NATO Parliamentary Assembly (NATO PA) aims to go beyond such headline-grabbing news. It seeks to realistically assess Russian military’s rising capabilities in a time of renewed tension between the Alliance and Russia, in order to inform the policy choices of NATO as well as Allied governments and parliaments.

2. The report examines the state of Russian military modernization efforts, which commenced in 2008. Most of Russia’s modernization efforts focus on organizational reforms pertaining to readiness levels and manpower. Readiness levels and manpower are vital elements of a state’s military power. While some experts doubt Russian military power based on a negative assessment of these two factors, evaluating them goes beyond the scope of this report and indeed the remit of the STC. This report therefore concentrates on the new and upgraded military equipment that Russia is acquiring – another fundamental element of military prowess. The report first provides an overview of the origins, general thrust, and limitations of modernization efforts. It then analyses efforts across the full spectrum of the Russian armed forces and ends with some concluding remarks.

II. ORIGINS OF RUSSIA’S MILITARY MODERNIZATION

3. After its poor performance in the five-day war with Georgia in August 2008, Russia initiated a sweeping programme of military modernization that continues to this day. While some in the Russian leadership recognized the need to modernize beforehand, resulting in the initiation of the first State Armaments Programme in 2006, they were unable to overcome entrenched resistance to change in the armed forces before the war. Despite some dissident voices, especially amongst retired officers, modernization efforts appear to be firmly secured – not least because of the heightened threat perception within the Russian leadership in the wake of its actions in Ukraine.

4. Termed the ‘New Look’ defence reform, Russia’s efforts aim to restructure the armed forces away from a Soviet model of mass mobilization, suitable for large-scale military confrontations, and towards a professionalized armed force with a much higher level of readiness. Key to the defence reform is creating smaller, but fully manned and ready, units largely equipped with modern systems.

5. In Crimea, Russia’s armed forces demonstrated dramatic progress from the conflict in Georgia. The armed forces noticeably improved personnel discipline, personal equipment, logistics, electronic warfare capability, and junior commander training. Some experts argue that Russia’s swift annexation of Crimea and the rapid deployment of 80,000 troops to the Ukraine border demonstrate that the Russian military has already successfully transitioned to an effective force at high readiness. However, it is important to highlight that in Crimea, Russia primarily relied upon its most elite special operations forces, which have long been given priority for training,

equipment, and funding. Thus, the professionalism and efficacy on display in Crimea are not indicative of the broader Russian military modernization efforts.

6. In parallel to its on-going modernization efforts, the current political confrontation with large swathes of the international community has led Russia to examine its official defence doctrines. In December 2014, Russia thus published an updated Military Doctrine. The new version maintains most of the provisions of the previous edition, published in 2010. The nuances changed only slightly regarding NATO: according to the Doctrine, main external risks to Russia's security continue to be NATO's military capabilities with its purported global reach and the potential accession of new members which would bring Alliance military infrastructure closer to Russia's borders. The updated Doctrine is leading to changes in the classified State Defence Plan, last adopted in 2013, but the exact changes to the Plan remain unclear.

7. Despite similarities between the latest two military doctrines, Dimitri Trenin of the Carnegie Moscow Center argues that the new Doctrine "makes it clear that even if the West is not officially an adversary, it is a powerful competitor, a bitter rival, and the source of most military risks and threats." Indeed, under President Putin, a perception of "encirclement" has come to the fore in Russia's political elite. The President put forward one of his most scathing indictments of Western actions in his speech on the illegal annexation of Crimea on 18 March 2014. Citing a long list of Western actions which he deemed against Russia, he concluded that "in short, we have every reason to assume that the infamous policy of containment, led in the 18th, 19th and 20th Centuries, continues today. They are constantly trying to sweep us into a corner because we have an independent position, because we maintain it and because we call things like they are and do not engage in hypocrisy. But there is a limit to everything. And with Ukraine, our Western partners have crossed the line, playing the bear and acting irresponsibly and unprofessionally."

8. While such hostile rhetoric emerged in the early 2000s, Russia only began increasing its arms procurement in earnest in 2010, following 20 years of acquiring very little. In 2010, Russia initiated a State Armaments Programme (SAP) that seeks rearmament of its forces by 2020, replacing Soviet-era weapons nearing the end of their designated life-span. While Russia claims it is not pursuing an arms race with NATO countries, it admits that these upgrades are designed to respond to threats such as the creation of US and NATO antiballistic missile systems, the "militarization of space", and the strengthening of NATO forces.

9. Russia's overall goal is for at least 70% of its military equipment to be "modern" by the end of 2020. However, no clear definition of the term "modern" is publicly available, making it difficult to establish baselines and gauge progress. At the end of 2014, Russia assessed that 32% of the armed forces' inventory had been modernized. This may be a useful marker of the scope of Russia's ambitions for modernization.

10. Before his re-election in 2012, Putin outlined the expected outcomes of the SAP. These included the following new procurements: 400 intercontinental ballistic missiles (ICBMs) and submarine-launched ballistic missiles (SLBMs); eight nuclear-powered ballistic missile submarines; 20 multipurpose submarines; 50 major surface naval vessels; 100 military satellites; 600 fixed wing aircraft; 1,000 helicopters; 2,300 tanks; 2,000 self-propelled artillery systems; 7,000 military vehicles; 56 S-400 air-defence system battalions; and ten Iskander-M tactical ballistic missile brigades. However, these outcomes are only a wish list – it remains unclear what exactly the Russian military will actually acquire over the next few years. According to most experts, what Russia says "is being purchased" or "will be delivered" is not what will definitively be acquired.

11. To achieve its modernization ambitions, Russia dramatically increased defence spending over the last few years. In 2012, Russia announced that it expected to spend approximately

RUB (roubles) 20 trillion (EUR 310 billion¹) on armaments by 2025. Another RUB 3 trillion (EUR 50 billion) would be spent on modernizing its defence industry. In 2015, Russia plans to spend 1.74 trillion RUB (EUR 30 billion) on its SAP – more than half of its RUB 3.3 trillion (EUR 50.7 billion) National Defence budget for the year, compared to less than one-third of the budget in 2005.

12. Furthermore, the percentage of Russian Gross Domestic Product (GDP) devoted to defence spending is increasing. In 2014, Russia spent almost 3.5% of GDP (EUR 66 billion) on defence, up from 3.15% in 2013. If the draft federal budget from September 2014 is fully implemented, Russia will increase defence expenditures to 4.2% of GDP in 2015. In 2016, defence expenditures would fall to 3.7% and decrease further to 3.6% in 2017. The increase in 2015 is partially explained by Russia’s decision to dispense with state-guaranteed credits – a non-budgetary means of expenditure – as a means of funding its state defence order, likely because economic sanctions have made external borrowing difficult. To compare, in 2014 (the last year where official NATO figures are available), NATO devoted 2.5% of its combined GDP to defence expenditures, and European NATO members only spent 1.5%. Only Estonia, Greece, the United Kingdom, and the United States meet NATO’s 2% defence expenditure target – a target reaffirmed at the 2014 NATO Wales Summit.

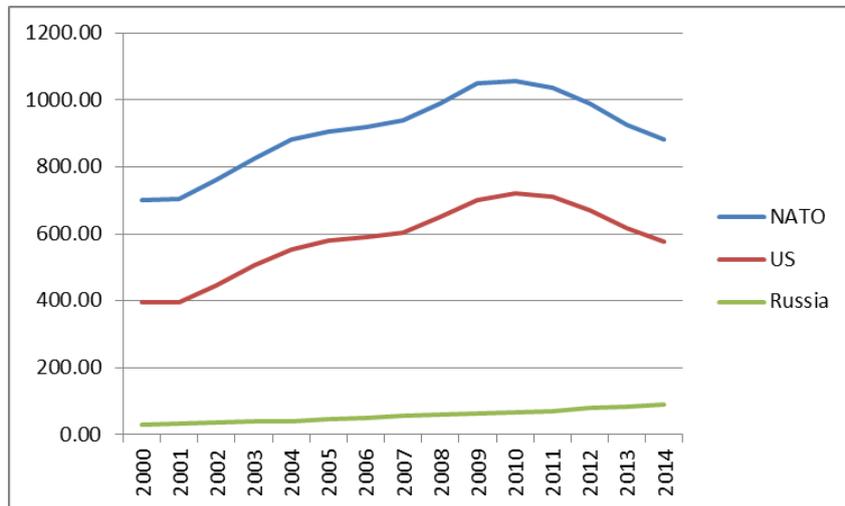


Figure 1: NATO, US and Russian Defence Spending Compared (2000-2015) (constant 2011 USD billions)

13. Despite grand ambitions and current allocation of funds, Russia’s modernization efforts face financial difficulties now and for the foreseeable future. Russia’s SAP is extremely expensive, with inflation and corruption making matters worse. The SAP, when first drafted, assumed an optimistic annual GDP growth of at least 6%. Instead, growth slowed from 4.3% in its first year of implementation to just 2% in 2013. In 2014, amidst falling oil prices and sanctions imposed by parts of the international community, Russia’s GDP growth slowed to just 0.6%, according to official Russian numbers. The Russian GDP has declined precipitously in the first quarter of 2015, with a fall of 4.3% as reported by Russia’s state development bank, VEB. However, the defence budget has escaped an almost across-the-board 2015 spending cut of 10%. Alarming for Russia’s fiscal health, economist Sergei Guriev estimates that “military expenditure exceeded 9% of quarterly GDP” in the first quarter of 2015, compared to the budgeted 4.2%. Russia’s modernization plans are further hindered by significant levels of corruption. Russia’s top military prosecutor estimates that 20% of money allocated to the state defence order is stolen. Other high-ranking officials believe that as much as 50% of funds that are siphoned off.

¹ All exchange rates as of 1 July 2015

14. Russia is also dealing with the effects of international sanctions. The European Union and the United States have imposed sanctions on the Russian defence sector due to Russia's illegal annexation of Crimea and Russia's continued military aggression in eastern and south eastern Ukraine. These particular sanctions are unlikely to significantly impact the implementation of the SAP because the Russian defence industry has little integration with European or North American industries. Instead, potential initiatives to restrict exports of dual-use technologies pose a more significant threat to Russia's plans. For example, the Russian electronics industry imports 25 to 30% of its components. Unlike the purchase of arms, Russia's efforts to modernize its defence industrial plants will likely be significantly affected by sanctions, since the domestic machine-tool industry is largely unable to produce the advanced equipment these plants require for production.

15. The conflict with Ukraine will also have wide-ranging consequences for the Russian defence industry and the SAP. According to the Polish Institute of International Affairs (PISM), as part of the import substitution programme in place until the end of 2015, Russia plans to start production of 695 weapons items of the 1,070 that were developed in co-operation with Ukraine. Before the conflict in Ukraine, Russia was dependent on the country for approximately 200 types of weapons and other military technology, including engines for helicopters and ships, illustrating the scale of the challenge.

16. Many analysts argue that the Russian Ministry of Defence' plans rely on overly optimistic assessments of how quickly Russian defence industry can produce new equipment – they assume no delays, technical or design problems, or bottlenecks. Over the first three years of the SAP, progress on rearmament was slow. During this time, Russia bought 30 ICBMs and SLBMs; two ballistic missile submarines (SSBNs) (without the complementing SLBMs); one corvette; 50 small combatants and support vessels; nine satellites; 80 fixed-wing aircraft (more than half being Yak-130 jet trainers); 140 helicopters; 11 S-400 battalions; two Iskander-M brigades; 160 artillery systems; and thousands of vehicles (primarily trucks). Russia also purchased arms not on Putin's 2012 list, including 60 tactical surface-to-air missile systems. However, as this report shows, the pace of arms procurement increased in 2014 and is expected to continue throughout 2015 as well.

17. Due to the reasons outlined above, the viability of the full implementation of such an expensive rearmament plan is extremely questionable. In fact, significant problems and delays already demonstrate that the capacity of the Russian defence sector is indeed lacking. For example, some procurement originally scheduled for 2016 and 2017 has been postponed – the inability to handle the large volume of orders by the Russian defence industry being the official explanation.

18. Examples of the difficulties the Russian defence industry is experiencing are legion, especially after the sanctions were put into place in 2014. About 500 defence companies already suffer from these sanctions. A number of defence deals have been put on hold or cancelled. The most prominent one being the delivery of Mistral vessels by France (see Section V) but other examples include joint ventures on infantry fighting vehicles (Renault Trucks Defence), small submarines (Italian Fincantieri), and a combat training centre (German Rheinmetall). Furthermore, while the share of foreign components in Russian military equipment was only about 10% before the sanctions, it will take several years to substitute these imports with components from Russia or other countries, such as China or India. The technological gap between Russia's and NATO military will thus widen in the short and medium term. To give but one concrete example of how

Rank	Country	USD 2011	%GDP
	NATO	880.68	
1	USA	577.51	3.50%
2	China	190.97	2.06%
3	Russia	91.69	4.50%
4	Saudi Arabia	73.72	10.40%
5	France	63.02	2.20%
6	UK	54.91	2.20%
7	India	50.00	2.40%
8	Germany	46.59	1.20%
9	Japan	59.03	1.00%
10	South Korea	33.14	2.60%

Figure 2: Top 2015 Military Spenders
(all numbers in constant 2011 USD billions)

Russian defence orders will likely not live up to promises, Russia's shipbuilding industry is likely to only build an estimated 50 to 70% of the vessels that the MOD wants to acquire by 2020, according to Dmitry Gorenburg of Harvard University.

19. In this adverse context, updates to Russia's modernization program are underway – the 2016-2025 programme is due for presidential approval by the end of 2015 and is expected to have a budget of RUB 30 trillion (EUR 490 billion). Putin stated in September 2014 that the modernization programme from 2016 to 2025 would focus on: building an array of offensive weapons to serve as a "guaranteed nuclear deterrent"; re-arming strategic and long-range aviation; fully developing and integrating an aerospace defence system; and acquiring high-precision conventional weapons as well as modern warships.

III. NUCLEAR FORCES MODERNIZATION

20. Nuclear weapons are the most crucial part of Russia's defence doctrine. At least in Russian policymakers' public remarks, they assume a larger responsibility than in NATO's nuclear weapon states. Most experts agree this is due to Russia's inferiority in conventional forces compared to its peers. For example, President Putin rarely gives a speech on foreign policy that does not mention Russia's strategic nuclear arsenal. The conditions for the use of nuclear weapons have not changed in recent military doctrines: "Russia reserves the right to use nuclear weapons in response to a use of nuclear or other weapons of mass destruction against her and (or) her allies, and in a case of an aggression against her with conventional weapons that would put in danger the very existence of the state." Russian nuclear deterrence rests on the strategic triad of ICBMs, SLBMs, and long-range air-launched cruise missiles. Russia also possesses a large quantity of non-strategic nuclear weapons.

21. At the beginning of 2014, Russia possessed an estimated 4,300 nuclear warheads that are assigned to operational forces. This arsenal is made up of about 2,300 strategic and 2,000 non-strategic nuclear warheads. Russia deploys approximately 1,600 strategic nuclear warheads on ballistic missiles or at strategic nuclear bomber bases. It keeps the remaining 700 strategic warheads in storage for potential deployment on submarines and bombers. In addition to the 4,300 assigned warheads, roughly 3,700 nuclear warheads are considered retired or slated for dismantlement. According to the Ministry of Defence, 56% of its nuclear weapons are "contemporary" models.

22. The current drive to modernize its nuclear forces is premised on four goals: to replace Soviet legacy systems with modern nuclear forces, to maintain rough parity with the US nuclear arsenal, to improve the survivability and efficiency of its nuclear weapons, and to maintain prestige on the international stage.

23. In 2014, Russia's long-range bomber fleet consisted of 62 Tu-95MS (Bear) and 16 Tu-160 (Blackjack) aircraft. An estimated 60 of these dual-use bombers are counted under the US-Russian nuclear arms control treaty, New START. Both these platforms are undergoing modernization to bridge the gap until the next-generation PAK-DA bomber will be delivered. Seven upgraded Tu-95MS and Tu-160 entered the Russian arsenal in 2014. Upgrades include new or improved engines, electronics, and cruise missiles. Modernization is set to be completed by 2020, but the plans for modernization are ambitious and, as stated earlier, possibly too ambitious regardless of the economic slowdown. Russia is putting emphasis on modernizing the newer Tu-160, which should remain in service until 2030. The funding of these modernization efforts has proven difficult in recent years. However, the recent shows of force with these two platforms over Europe and the North Atlantic have underlined the role they play in Russia's deterrence posture. Experts thus believe that funding streams will increase.

24. Design work for a next-generation long-range bomber, which will replace the Tu-95MS and Tu-160 as well as the non-strategic bomber Tu-22M3 (Backfire), started in 2011. Russia signed formal development contracts in early 2014. Tupolev has completed the design of the PAK-DA, and a first engine test occurred in late 2014. The company does not discuss the detail of design and configuration of the new aircraft, and the exact development schedule, design, as well as numbers to be built are still unclear. However, most analysts believe that the sub-sonic bomber will have a flying wing design. Tupolev aims to fly a prototype in 2019. Production is scheduled to begin in 2023, with full entry into service around 2030.

25. The Russian ICBM force is gradually being modernized, as Soviet-era ICBMs are replaced with modern missiles. The RS-12 Topol-M (SS-27 Mod 1) continues to be the backbone of the modernization efforts which started in the late 1990s. A silo-based version has been deployed since 1997 and a road-mobile version since 2006. In 2014, Russia received 16 new land-based ICBMs. In June 2015, the announcement by President Putin that Russia will field an additional 40 ICBMs in 2015 drew condemnation by NATO. While this is in line with Russia's overall nuclear modernization plans, NATO leaders are very concerned with the increasing nuclear rhetoric behind these plans. NATO Secretary General Jens Stoltenberg thus called the high-profile announcement "sabre rattling" and underlined that it was "destabilising and dangerous".

26. In 2009, Russia has also begun deploying a variant of the Topol-M called RS-24 Yars (SS-27 Mod 2). The Yars ICBM possesses a Multiple Independently Targetable Re-entry Vehicle (MIRV) containing three nuclear warheads. A road-mobile version has been deployed since 2010, and Russia is currently beginning to field a silo-based version of the Yars as well. Work is also underway on the Barguzin system, a rail-mobile ICBM design that will carry Yars or Yars-M missiles. The Barguzin system is expected to become operational in the 2020-2040 timeframe. In 2014, three Yars regiments became operational.

27. Russia is also developing yet another modification of the Topol-M – the RS-26 (Rubezh). It will be significantly lighter and thus more manoeuvrable. Furthermore, a new heavy ICBM is also under development, which will be liquid-fuelled, silo-based, and MIRVed. It is currently known as Sarmat and should replace the RS-20V (SS-18 Satan). The first test of a Sarmat is scheduled for 2015, with deployment planned for 2020. The defence industry is also working on another rail-mobile MIRVed missile, which would be light and small. The status of this missile is still unclear. Furthermore, Russia is actively trying to develop a hypersonic warhead under the Project 4202 programme, which could be nuclear weapons-capable.

28. Russia's sea-based leg of the nuclear triad is based on its three Delta III and six Delta IV class SSBNs. On its Delta IV SSBNs, Russia has replaced an old generation of SLBMs with the MIRVed RSM-54 Sineva (SS-N-23 M1). Russia is also introducing a modified version known as Layner. Some argue that the Layner's increased payload could mean that Russia would exceed its warhead limit under the New START Treaty; others dispute this. In 2014, Russia procured 22 SLBMs.

29. The Delta class SSBNs will be replaced with 12 Borei class SSBNs. Eight of these have already been contracted, while another four will likely be ordered in the next decade and are likely to be updated versions of the current Borei II subclass. The Borei class SSBNs will carry the ten-warhead MIRVed SS-NX-32 (Bulava) SLBM. The Bulava programme has been beset with great difficulties from the outset. Indeed, the programme was paused in September 2013, due to a test failure. It was successfully revived, due to a number of successful tests, in 2014. As of July 2015, 20 test launches had been conducted, with only 13 successful ones.

30. The greatest uncertainty surrounds Russia's non-strategic nuclear weapons arsenal – its size, composition, and location. Most analysts believe that Russia has about 2,000 warheads available for its operational forces. Many more are either retired or await dismantlement. Most of these warheads are Soviet-era legacy systems. However, Russia's nuclear modernization includes

non-strategic nuclear weapons, as they play a large role in Russian military doctrine, most importantly to compensate for continuing weakness in conventional forces compared to its peers.

31. The deployment of the new Iskander-M (SS-26) short-range ballistic missile started in 2004. In 2014, two Iskander-M brigades became operational. Constant fears and rumours have emerged about the areas of deployment of the Iskander-M. A number of them are certainly stationed close to NATO territory, for example around St. Petersburg. Over the last year or two, rumours emerged intermittently that some had been deployed in the Kaliningrad enclave between Poland and Lithuania. In December 2014, Russia acknowledged moving Iskander-M missiles to Kaliningrad during a military exercise. It is unclear whether the missiles were pulled back afterwards or if they stayed behind. Persistent but unsubstantiated allegations have emerged that Russian nuclear weapons have been deployed to Crimea. Supreme Allied Commander General Philip Breedlove has said that nuclear-capable forces have been moving to the peninsula, but it is unknown whether nuclear weapons have moved there as well.

32. Modernization of the nuclear-capable Tu-22 M3 (Backfire) intermediate-range bomber and the Su-24M (Fender-D) fighter-bomber are also underway. Moreover, Russia has been introducing the new nuclear-capable Su-34 (Fullback) fighter-bomber as well.

33. The new long-range Kalibr cruise missile under development for the Yasen class submarines might have nuclear capability (see Section II).

34. Controversy also erupted in 2014 due to a new nuclear-capable missile platform. After years of non-official allegations, the United States publicly accused Russia in 2014 of testing a missile prohibited under the 1987 Intermediate-Range Nuclear Forces (INF) treaty. The treaty forbids ground-launched ballistic and cruise missiles with ranges of between 500 and 5,500 km. The United States did not disclose what system it found in non-compliance. However, many analysts point to a cruise-missile version of the Iskander-M – the Iskander-K. Others pointed out that certain concerns had previously been raised in connection with the RS-26 (Rubezh) missile as well. They believed it might have been tested at a range below 5,500 km, but most experts accept it as an ICBM.

35. Russia is also working hard on augmenting its non-nuclear long-range precision weapon arsenal. The 2014 Military Doctrine affirmed the importance of conventional long-range precision guided munitions. Russian military leaders see them as means for “non-nuclear (pre-nuclear) deterrence”. Whether they will be able to successfully produce and field such systems is an open question, but as NATO staff officer Dave Johnson points out, “Russia’s propensity to field dual-capable systems in combination with its new thinking on the role of conventional precision-guided munitions in deterrence scenarios will contribute to ambiguity and uncertainty, particularly in crisis scenarios.” The Iskander system, for example, can be fielded as a nuclear or non-nuclear system.

IV. GROUND FORCES MODERNIZATION

36. Russia’s practice of snap inspections and exercises, which began in 2013 and were used to cover preparation for intervention in Ukraine in 2014, highlighted areas for the ground forces in need of improvement. In particular, inspections revealed problems with one-year conscription soldiers, training in the use of equipment, and lack of leadership. The exercises also showed that the percentage of military equipment fit for service was generally unsatisfactory. For example, less than 65% of the equipment of the ground forces was assessed as fit for service.

37. Modernization efforts in the ground forces have focused on organizational changes as well as increasing professionalism, recruitment, and manning. Additionally, the Oboronservis state corporation, which specializes in repair of equipment and support of military units, was restructured and its first-line equipment repair and maintenance units strengthened.

38. As of 2014, Russia's ground forces received relatively small amounts of new equipment from the rearmament efforts, but this is set to change, as upgrade and acquisition programmes begin in earnest.² The SAP 2010-2020 includes the delivery of 2,300 modern or modernised main battle tanks, 2,000 self-propelled artillery systems, and around 30,000 other armoured and unarmoured vehicles.

39. The mass modernization of the fleet of T-72B main battle tanks (first introduced in 1973) continues after the first T-72B3s were delivered in 2013. The T-72B3s are fitted with new engine, gunner's sights, fire control system, and other improved technology. The T-72B3 now has a hunter-killer capability, giving the commander the ability to look for new targets while the gunner engages a target already acquired. The latest derivative of the BTR-80 wheeled armoured personnel carrier (APC) – the BTR-82A – is also being delivered in large numbers. The pace of delivery slowed in 2014, as Russia expects that new wheeled and tracked vehicles will be introduced over the next few years (see below). Still, according to Russian media, in 2015, Russia's land forces will restart purchasing new models of the veteran BMP-3 infantry fighting vehicle and will again receive higher numbers of BTR-82As and T-72B3s.

40. Russia's armed forces presented prototypes of new vehicle platforms during the Victory Day Parade on 9 May 2015 in Moscow. These new platforms represent the largest vehicle modernization since the 1960s and 1970s. The new vehicles are the first truly new armoured vehicles designs in over 40 years. All previous armoured vehicles were based on designs originating in the 1960s and 1970s. The first models are anticipated to be delivered to the troops for testing later in 2015. This will be the beginning of a considerable rearmament programme for the ground forces.

41. The Armata Universal Combat Platform will be the common platform for a wide range of new vehicles. Seven T-14 main battle tanks, which are based on the Armata, debuted at the 2015 Victory Day Parade. The T-14s will replace the T-72M3 and T-90 main battle tanks currently in service. A key feature of the T-14 new platform is its unmanned turret, which should significantly increase crew survivability. Fourteen T-14s are planned to be produced initially. The T-15 heavy Infantry Fighting Vehicle (IFV), also based on the Armata platform, was also displayed for the first time at the Parade. Other Armata-based vehicles being planned are reported to include the BREM-1 armoured recovery vehicle (Object 608), MT-A armoured bridge layer, MYM-A engineering vehicle, BMO-2 thermobaric multiple rocket launcher variant, and USM-1 mine layer.

42. Another new platform, Kurganets-25, was displayed in two variants at the May Parade: as an armoured IFV (Object 695) and APC (Object 693), and will serve as a replacement for Russia's BMP family of vehicles. Analysts believe that Kurganets-25 weighs about 25 tonnes, which is a sharp weight increase compared to previous Russian designs and is significantly wider and taller than the vehicles it plans to replace.

43. The eight-wheel drive Bumerang (Boomerang) APC was also shown for the first time at the Victory Parade. The Bumerang was developed as a successor to the BTR-series of wheeled IFVs/APCs and shows strong similarities to western eight-wheel drive vehicles.

44. A new-generation airborne combat vehicle, the BMD-4M (Object 960M) has also been developed using components of the BMP-3. Furthermore, Russian industry is producing the BTR-MDM (Object 955M), which will replace older airborne APCs.

² The Russian airborne and special operation forces are not directly addressed in this section. They are Russia's most elite forces and thus already possess or will be the first ones to receive the most sophisticated equipment mentioned in this section.

45. Russia also highlighted the 2S35 Coalition SV (Koalitsiya-CB) self-propelled artillery system at the Victory Parade, which will replace the 2S19 MST-A self-propelled artillery system currently used by Russian forces. Georgy Zakamennih, the chief director of TsNII Burevestnik, the developer of the 2S35, says that is an innovative, highly autonomous robotised complex rather than a classic self-propelled gun.

46. Combined with the Typhoon wheeled logistics platform, which Russia highlighted during the 2014 Victory Day Parade, the new platforms presented in this section will replace nearly all of Russia's existing vehicle families. They will shape the future capabilities of the Russian land forces in the coming decades. The reported weight and size of the vehicles indicate a shift in design towards armour protection and crew survivability, which are typically emphasized in the West. Previous Russian designs opted instead for manoeuvrability and low vehicles profiles. Analysts expect that the larger, heavier, more complex and more expensive designs of the new vehicles may significantly challenge Russia's domestic industrial base and slow down Russia's rearmament if they are put into full-scale production.

47. At the level of the soldier, Russia is developing the new generation Ratnik equipment packages for its ground forces. The equipment programme aims to enhance the soldier's protection level, fire power, life support, and energy supply system. Equipment will be improved across the board, inter alia with new protective gear, weapons, ammunition, and other new or improved items. The programme appears to be modelled on the updates to soldiers' equipment which NATO countries put into place over the last decade. Ratnik packages will weigh about a third less than current equipment. The new main weapon aims to be 20% more effective. Already in use by Russian special forces, as seen during the takeover of Crimea, the Ratnik system is also being tested in the ground forces, the airborne troops, and naval infantry. According to official Russian sources, 70,000 Ratnik systems are planned to be bought. A follow-on programme to Ratnik could arrive in the 2025-2030 timeframe.

V. NAVY MODERNIZATION

48. Throughout the 1990s and early 2000s, Russia's operational navy was mostly limited to a few functioning SSBNs. Indeed, the navy was realistically only fit for nuclear deterrence and coastal protection. Even today, the Russian navy is still largely composed of Soviet legacy vessels. It possesses about 270 vessels, of which about 125 are in working condition and only 45 of those are ocean-going surface warships or submarines in good working condition and deployable. Few new warships are currently operating, and most ships commissioned in recent years are relatively small. Its heavy cruisers, destroyers, and the *Admiral Kuznetsov* – Russia's sole aircraft carrier – are badly in need of repairs. Furthermore, the navy will decommission many of the Soviet-era vessels in the coming years. In light of the current state of affairs, the Russian navy is investing in a time-phased recapitalization over the next 20 years. The new naval doctrine released in July 2015 singles out the Arctic, Atlantic, Mediterranean, and Black Sea regions where Russia wants to build up its naval assets. The first phase of Russia's naval modernization concentrates on submarines and is already underway. Smaller surface combatants will be next, followed by increased amphibious capabilities. The modernization of cruisers and destroyer will not begin before the 2020s.

49. Historically, the Russian navy has had four missions: strategic deterrence; coastal defence; protection of sea lanes of communication; and out-of-area deployment. However, its primary mission remains strategic deterrence. Its submarines are an important part of its nuclear forces. Therefore, once Russia increased funding for the navy, the development and construction of new submarines proceeded quickly (see Section II). In 2014, the Russian navy received three new submarines, one of them a nuclear-weapons SSBN. For 2015, the Russian navy fleet is likely to receive only one SSBN, the *Aleksandr Nevskiy*. Although two SSBN submarines were planned for this year, there are not enough Bulava missiles available to equip the *Vladimir Monomakh*.

50. In terms of conventionally armed submarines, Russia has ordered eight Yasen class nuclear powered cruise missile submarines, and could order four more after 2020. These would replace Oscar class submarines and various smaller submarines. Moreover, a plan exists to develop a new multi-purpose attack submarine with decreased missile armament. The Russian navy hopes to begin construction of these submarines by 2016 and complete at least 15 by 2035. Additionally, six Improved Kilo class diesel submarines are being completed for the Black Sea Fleet. Future orders for diesel submarines are expected to be modernized Lada class diesel-electric submarines. The goal is to build 14 to 18 such submarines over the next 15 years.

51. Next to its submarine programme, Russia has been rebuilding its coastal defence capabilities. The SAP includes a number of highly capable, well-armed smaller vessels (corvettes and frigates). These vessels are expected to carry advanced attack and defensive missiles. In addition, eight *Admiral Gorshkov* class frigates are already under contract. Some experts expect that eight more such frigates will be built along with another 20 corvettes. Six *Admiral Grigorovich* class frigates are already under construction, and another three may be ordered. However, these programmes will be delayed due to the conflict between Russia and Ukraine, as Ukraine's defence industry played a decisive role in these programmes. In 2014, the navy received five surface warships and 10 corvettes.

52. By choosing to focus on coastal defence, Russia has delayed the modernization of blue-water/expeditionary capabilities. Russia has a number of projects to modernize older cruisers and destroyers under way and further projects are being considered. However, its ability to deploy on long-range missions will decline moderately in the short-term and only increase in the medium- to long-term. The Russian navy is planning to begin the production of large destroyers , with a range of offensive and defence armaments and capabilities comparable to those of a cruiser, including hypersonic cruise missiles (which travel at a minimum of five times the speed of sound) and a naval version of the S-500 long-range air defence system (see next section). Russia hopes to have the first such vessel ready between 2023 and 2025 and eventually build at least 12 of these destroyers.

53. Although the navy is receiving modern vessels, the scope of its modernization is constrained by the capacity of its domestic industry, as mentioned in Section II. Until the invasion of Crimea, Russia relied on Ukraine as its primary supplier of ship engines. Russian domestic industry will face difficulties ramping up production of these engines at home. Furthermore, Russian domestic industry currently cannot produce bigger vessels. This led Russia to order two Mistral-class amphibious assault ships (or Landing Helicopter Dock (LHD)) from France in 2010 (with an option for two additional ships). The impetus for the purchase of LHDs can be traced back to the Russian-Georgian war when the Russian navy did not have any vessel capable of landing substantial numbers of troops either via a beach landing or via heli-borne lift. In contrast, every sizable NATO navy, except Germany, already has LHDs in their fleet. Two of the LHDs ordered were produced by French naval yards, with Russian participation. France suspended this deal in September 2014, due to Russia's illegal annexation of Crimea and its military aggression in eastern and south-eastern Ukraine. On 5 August 2015, France and Russia came to an agreement on the two ships. According to the French government, "the Russian Federation is exclusively and fully reimbursed for the sums advanced under the contract; the Russian equipment which was installed on the ships will be recovered; France will have full ownership and free disposal of the two ships." France agreed to pay Russia just shy of 950 million EUR: 892.9 million EUR for Russia's advance payment of the two ships; 56.85 million EUR for expenditure related to the Russian crew and team of specialists coming to France and for the cost of specific Russian equipment. Russia confirmed that the affair is now fully settled. In September 2015, France and Egypt agreed that Egypt would buy the two vessels for between 910 and 950 million EUR.

54. Russia wants to replace all existing amphibious ships with new classes, starting around the middle of the next decade. Similarly, amphibious vessels should enter the fleet. It plans to build a

new landing platform/dock type ship with the ability to carry 500 to 600 naval infantry, six helicopters, and a variety of amphibious vehicles, with construction beginning late this decade. Progress is also being made on the *Ivan Gren* amphibious ship, with the lead ship expected to be commissioned in 2015 and eight such ships to be built in total.

55. Debate continues on new aircraft carriers, but the first such vessel would not be ready until 2030 at the earliest, according to experts. However, as this is a longer-term plan, its execution depends on the continued availability of funds. Overall, for at least the next decade, even if Russia continues to maintain high levels of financing, the navy will not have the capacity to deploy significant battle groups outside its immediate neighbourhood. More likely, Russia's economic downturn will force the state to further prioritize amongst its many modernization initiatives. This would result in decreased funding for the Russian naval fleet.

VI. AIR FORCE AND AIR DEFENCE MODERNIZATION

A. AIR FORCE

56. The organizational reform of the air force has been the most controversial element of the Russian drive for modernization – in particular because of repeated changes in basing arrangements. Albeit after a rocky start, the roll-out of new equipment has been comparatively successful (for nuclear-capable bomber aircraft, see Section I). In 2014, the Russian air force received 142 new fixed-wing aircraft, 135 rotary-wing aircraft, and 179 unmanned aerial vehicles (UAVs). In 2015, the military plans to receive another 126 fixed- and 88 rotary-wing aircraft.

57. In terms of fighter jets, derivatives of the original Sukhoi Su-27 Flanker (first flight: 1977) are currently Russia's most advanced fighters and have been exported to a few countries. The Su-35S Flanker E, which flew for the first time in 2009, is currently the flagship in this family. In 2015, Russia should receive the last deliveries to bring the total number of Su-35S up to the planned 48. The aircraft features new digital on-board equipment; passive electronically scanned array radar; more powerful engines with thrust vector control, giving it extreme manoeuvrability; and other advanced technology. Indeed, some experts argue that it is effective in detecting low-observable aircraft. Russia markets the Su-35S Flanker E as a "Generation 4++" aircraft. Other modern aircraft of the Su-27 family currently in production in Russia are the Su-30 multi-role combat aircraft and the Su-34 Fullback fighter bomber.

58. Russia is working hard on the fifth generation PAK FA project, being developed by Sukhoi. Its T50 prototype will succeed the Su-27 family and the MiG-29. The T50 first flew in January 2010 and has since been tested by the factory. The total number of prototypes should reach eight in 2015. The air force plans to operationally test the aircraft in 2016 – three years later than originally planned. The air force is set to receive first deliveries in 2016; with full delivery of 55 T50s by 2020. The T50 is a stealth fighter developed in co-operation with India and aims to compete with the F-22 and F-35 in terms of capabilities. Indeed, some analysts believe that it could outperform the F-22 (first flight: 1997) – even though the T50 is behind the general technological trend. Among others, the T50 includes a new avionics suite, advanced phased-array antenna radar, and technological advances that decrease the work load on the pilot. The defence industry is also lobbying the Russian government to develop another, lighter fifth generation fighter, which it has begun to work on independently of government initiatives.

59. While the delivery of new aircraft is well underway, the arrival of new non-nuclear precision guided air weapons has been slow with multiple programmes running into problems. An exception is the Kh-555 (AS-15C Kent), an air-launched long-range cruise missile, which is being produced in high numbers. In 2013, the Russian Minister of Defence announced an increase in the number of precision guided missiles by five times in 2016 and by 30 times in 2020. Russia does not reveal the stock of missiles it has, but this large increase over such a short period could point to a low base stock of missiles. Russia also has an ambitious development programme for hypersonic

missiles. By 2020, Russia plans to field a hypersonic missile with a range of 1,500 km and a speed of Mach 6. By 2030, it wants to deploy a missile with global coverage at a speed of Mach 12.

60. Russia's air force currently does not have its own fleet of UAVs and does not possess any UAVs with strike capability. While Russian industry is producing a number of different types of UAVs, the vast majority of its roughly 500 UAVs is assigned to land and airborne forces. To change this state of affairs, in early 2014, Defence Minister Sergei Shoigu said the Russian military plans to spend roughly EUR 9 billion on UAVs before the end of the decade. Russia has launched three unmanned combat aerial vehicle programmes, aiming to develop one-, five-, and 20-tonne UAVs. The heaviest unmanned combat aerial vehicle, comparable to a manned strike aircraft, is under development and supposed to fly by 2018.

61. Development of new Russian rotor-wing aircraft is progressing more slowly, but the most recent products are selling well to Russian and third states' armed forces. The latest attack helicopter, for example, is the Mi-28NE "Night Hunter", which is designed to carry out search and destroy operations against tanks, armoured and un-armoured vehicles, enemy personnel, and low-speed airborne targets. Russia is also upgrading and developing fixed- and rotary-wing transport aircraft. Russia will have to rapidly increase production of engines for the Ka-52 helicopter (*Hokum B*), as these engines were previously supplied by Ukrainian firm Moto-Sich.

62. The Russian plan for strategic lift aircraft has suffered a heavy blow due to its actions in Ukraine. The plan was to procure a number of Antonov An-124 type heavy transport aircraft and An-70 medium-range transport aircraft. Russia still aims to procure dozens of the medium to heavy transport aircraft Il-476 – an upgrade of the Il-76

B. AIR DEFENCE

63. In recent years, the modernization of Russia's aerospace defence system is receiving organizational priority to enhance the survivability of Russia's strategic nuclear forces – a link that has always been strong in Russian military thinking. At the same time, Russia is modernizing its system to improve interdiction of Russian air space to potential opponents. Modernization efforts include measures to ensure the detection of ballistic and long-range cruise missiles in the boost phase, the updating of existing anti-ballistic missile defence systems, as well as the development of advanced air defence systems.

64. Missile defence in the Russian Federation is the task of the Aerospace Defence Forces, established in 2011 as a new branch of the Armed Forces of the Russian Federation. Broadly speaking, the Aerospace Defence Forces are responsible for Russia's missile defence systems, early missile warning and space control systems, as well as launches of spacecraft. The overall aim of the aerospace reform efforts is to fully integrate all air and missile defence systems into one command and control system between 2016 and 2020.

65. Russia deploys fixed and mobile land- and ship-based air and missile defence systems. Russia has announced it will invest about EUR 40 billion in new weapons and upgrades to its existing aerospace defence systems. At the heart of these new capabilities are two new surface-to-air air defence systems. The S-400 Triumf (SA-21 Growler) entered operational service in 2007. By 2020, 56 battalions are planned to be in service. In 2014, seven S-400 systems were delivered. Next to its air defence role, the S-400 has the ability to defend against short- and medium-range ballistic missiles. It has an operational range of 400km in its most capable configuration. The S-500 Triumf-M system is currently in development. In addition to its air defence role, it is designed against intercontinental ballistic missiles, sub-marine launched ballistic missiles, and hypersonic missiles. It is planned to have an operational range of 600km. The S-500 is long behind schedule. After an announcement of introduction around Moscow in 2016, official sources claim it can be introduced by 2018, but experts doubt even this assertion. Furthermore, the ballistic missile defence system for the Moscow region, the A-135 Amur, is to be replaced by

the A-235 Samolyet-M, which will be able to intercept by kinetic kill as well as nuclear weapon detonation. Several new radar systems and sites are under construction or in planning as well.

66. Russia has also developed a new short- to medium-range surface-to-air missile and anti-aircraft artillery weapon system, called the Pantsir-S1. The system first entered service in 2012 and about 200 are estimated to have been built so far. Naval and Arctic versions of the Pantsir-S1 are under development and a next generation Pantsir system is planned for 2017.

VII. BUILDING UP CYBER CAPABILITIES

67. While little definitive is publicly available regarding Russia's cyber capability, the cyber threat posed by Russia is widely seen to be increasing.³ Cyber attacks are a key part in Russia's "hybrid warfare" tactics, which are the subject of a 2015 Defence and Security Committee report.⁴ Reports of possible Russian state-backed cyberattacks were unusually high in 2014, with NATO, Ukrainian, and Baltic governments among the specific targets. The timing of some of the more salient attacks suggests that the attacks could have been part of a Russian state-backed response to the imposition of sanctions for its actions in Ukraine. One prominent example includes the August 2014 hacking of JP Morgan's computer system, resulting in 76 million household records and seven million business records being compromised. During the official investigation into the incident, it was revealed that other financial institutions were also targeted.

68. In 2015, the US intelligence community described Russia, for the first time, as the number one nation-state cyber threat to the United States. US Director of National Intelligence, James Clapper, claims that Russia's new cyber command plans for offensive activities, "including propaganda operations and inserting malware into enemy command and control systems." The establishment of such a command within the Russian armed forces was announced in March 2012, but few reliable details on its remit were previously available.

69. The US intelligence community's 2015 annual worldwide threat assessment also highlights public reports of Russian cyber actors developing the capability to hack into industrial control systems that run mass-transit systems, electric power grids, air-traffic control networks, and oil and gas pipelines. However, while assigning attribution has become easier in recent years, it is still very difficult. Thus it remains unclear whether the Russian state or individual nationalists are responsible for such attacks when they occur. Therefore, the sophistication, capacity, and will of the Russian state to utilize offensive attacks also remain uncertain.

70. Director Clapper's assessment of Russian offensive attentions is contrary to publicly available Russian doctrine. At the end of 2011, Russia released its first official doctrinal document on the role of the Russian military in cyberspace, entitled "Conceptual Views on the Activity of the Russian Federation Armed Forces in Information Space". The document is entirely defensive in tone, with no mention of the possibility of offensive cyber activity. Instead, it focuses on force protection and preventing an information war.

71. It is important to note that Russian offensive cyber capability and intent are not new. In 2007, an alleged cyberattack on the US Department of Defense compromised unclassified and classified networks with a piece of malware originating from Russia. This breach was used to catalyse and

³ This section does not look at Russian propaganda in cyber space. This is a separate topic from cyber-attacks, as they fall under Russian information operations. This topic is covered in the 2015 Report [The battle for the hearts and minds: countering propaganda attacks against the Euro-Atlantic community \[164 CSDG 15 E bis\]](#) by the Committee on the Civil Dimension of Security's Subcommittee on Democratic Governance

⁴ See Defence and Security Committee's General Report [Hybrid Warfare: NATO's New Strategic Challenge? \[166 DSC 15 E\]](#)

justify the establishment of US Cyber Command, which was activated in 2010. The same year, websites in Estonia were subjected to a series of significant distributed denial of service attacks (DDoS), making targeted websites unavailable for use. Estonia claimed that Russia was behind these attacks and called on NATO for assistance. Georgian websites were subjected to similar attacks prior to and during the August 2008 armed conflict with Russia, with 90 percent of Georgian government websites being affected. A similar pattern occurred in Ukraine in 2014, with small-scale DDoS and defacement attacks against Ukrainian websites, coupled with accusations by Kyiv about interference with mobile networks. However, all of these attacks were less sophisticated than attacks against critical national infrastructure and many relied on malware whose origins date back a number of years.

VIII. CONCLUDING REMARKS

72. As political tensions continue to rise between Russia, on the one side, and Europe, North America, and significant parts of the wider international community on the other side, it becomes increasingly important to separate fact from fiction regarding Russia's military modernization efforts. Most importantly, policy-makers in Europe and North America, including the parliamentarians of the transatlantic Alliance, need to understand which new Russian military equipment represents upgrades or replacement of aging systems in line with Russia's status in the international community, and which new technologies could indeed be destabilizing the politico-military situation in the Euro-Atlantic area. If and when Russia develops particularly destabilizing new weapon systems, the international community needs to call attention to such systems, including through NATO PA reports and resolutions.

73. Much of the equipment procured or under acquisition as a result of Russia's rearmament may be considered in line with what would be expected, considering Russia's stature in the world and 20 years of neglect of the armed forces following the fall of the Soviet Union. Furthermore, much of Russia's modernization responds to weaknesses highlighted during the 2008 war with Georgia. Even though Russia's actions were deplorable in 2008, it is normal for countries to modernize in response to poor performance. Policymakers should not be drawn into fear-mongering in the face of military modernization alone, but assess these efforts realistically and in combination with Russia's actions, which regrettably have been increasingly detrimental to Euro-Atlantic security over the last several years. However, assessing Russia's military modernization realistically is often made difficult because of the lack of transparency on the part of the Russian government, including on benchmarks for success or failure of reforms, and the weakness of its free press. Indeed, policymakers cannot take Russian officials by their word on modernization, as it will likely continue to underperform due to falling state revenues, high levels of corruption, the weakness of its defence industry, organizational inertia, and unrealistic targets. Nevertheless, it is abundantly clear that Russian military capabilities have increased substantially since 2008 and will continue to do so.

74. In contrast, parliaments and government of the Alliance need to make clear when Russia is engaging in destabilizing armament efforts. They should also encourage Russia to fully support arms control, disarmament, and non-proliferation efforts. The combination of Russian modernization of nuclear weapons and ground forces, the apparent violation of the INF Treaty, and the complete cessation of activities under the Treaty on Conventional Armed Forces in Europe (CFE Treaty) (which could lead Russia to violate CFE provisions on the amount of conventional military equipment in the European part of the country) is perhaps the most worrying aspect of Russia's current policy course.

75. Of course, modernization of military equipment is only one part of the politico-military picture in the Euro-Atlantic area. The organizational capacities and motivation of the armed forces as well as the behaviour, perceptions, and intentions of the Russian leadership are equally fundamental to craft appropriate policy responses vis-à-vis Russia. For its part, NATO should increase its scrutiny

of Russia, follow its adaptation to Russia's changed behaviour as outlined at the 2014 Wales Summit, and modify its responses according to Russian actions. Among the most difficult challenges for NATO are the Russian employment of "hybrid warfare" tactics; Russia's ability to amass large numbers of troops on short notice; and the increasing emphasis on Russia's modernizing nuclear weapons arsenal. NATO is responding robustly to the first two challenges, but a renewed discussion of the role of nuclear weapons in the Alliance could lie ahead for NATO as a whole and those countries possessing or hosting nuclear weapons in the Alliance.

76. Russia's economic deterioration will likely curb military spending and force serious modification of the State Armaments Programme. It is important to remember, however, that recent Russian aggression has relied heavily on other tools like cyber warfare and information propaganda which likely are not heavily influenced by its economic situation. If Russian behaviour continues to follow the current path of annexation and occupation or takes a turn for the worse, Allied states could also examine whether to restrict certain categories of dual use technology.

77. However, sanctions may not be enough – the Alliance must be prepared to defend its Allies if necessary. The poor state of the Russian economy does not mean that the Alliance can relax. Instead, NATO member states focus on continuing to modernize their own forces, which requires significant investment. It is well-understood that NATO member states face difficult fiscal choices. Nevertheless, in light of the impact of the dramatic reductions in defence spending over the last years, NATO member states agreed "to move towards the existing NATO guideline of spending 2% of GDP on defence within a decade" at the Wales Summit. Raising spending levels will be difficult – but necessary – in most countries. It will therefore become increasingly important to monitor Russian military modernization and, given the long time lines in defence procurement, to prudently increase and redirect spending to counter those developments which threaten to undermine Euro-Atlantic security, all the while being careful not to spur an arms race between Russia and NATO. Parliamentarians are key to all the steps. The STC will therefore continue to follow Russian military modernization and develop appropriate policy recommendations.

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