

Russia and the Next RMA

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Russian leaders have long openly advocated an “asymmetric” or “indirect” military strategy that privileges weapons based on so-called “new physical principles” and technologies. In 2014 in his annual address to the Federal Assembly, President Putin reiterated that, “We have no intention to become involved in a costly arms race, but at the same time we will reliably and dependably guarantee our country’s defense in the new conditions. There are absolutely no doubts about this. This will be done. Russia has both the capability and the innovative solutions for this.”¹ Echoing such sentiments, Putin’s adviser for military policy, General Alexander Burutin wrote that, “A crucial element in our plans for the development of new armaments must be an orientation towards an asymmetric response to the development and entering into service of the expensive new systems of the developed foreign countries.”² Commenting on Burutin’s advocacy, the Norwegian scholar Tor Bukkvoll remarks that in Russian thinking asymmetric technologies should have a disruptive effect on new Western technologies, be developed in areas where Russian defense industry has particular advantages, and be much cheaper to develop and produce than Western technologies. And these discussions also emphasize acquisition of anti-access and area denial (A2AD) systems and technologies.³

This call for new weapons on the basis of an asymmetric strategy is a constant refrain in Russian discourse, namely, that Russia will not be drawn into the arms race that the West allegedly seeks to foist upon it but will defend itself asymmetrically with regard to both strategy and to procurements. Indeed, Russian leaders and analysts believe that this orientation towards an asymmetric strategy must emphasize nuclear weapons, including among them both long-range, TU-22M3 strategic bombers and the short-range

Iskander dual-use missile, as well as ICBMs, nuclear missile submarines, ground-based ballistic and cruise missiles, and a modernized conventional force to bypass the U.S.' ballistic missile defense network (BMD).⁴ But, at the same time Russia, as described below is moving towards a new generation of hypersonic nuclear weapons in line with the emphasis on new, disruptive technologies.

Thus this refrain and the associated policy guidance that comes with it continue up to today, as President Vladimir Putin's most recent remarks make clear. Putin's recent remarks reiterate well-established points of his worldview. Putin has frequently charged NATO and the U.S. with trying to force Russia into an unsustainable arms race but also argues that under his leadership Russia will not only pursue an asymmetric strategy but will produce more than enough capability to defend its vital interests. Furthermore he has equally repeatedly insisted that Russia focus on new and new types of weapons.⁵ Moreover, from Putin on down Russian writers almost unanimously see the U.S. threatening both the concept of strategic stability and Russia by simultaneously building a ballistic missile defense system in Europe and Asia (BMD) and the capabilities to launch a Conventional Prompt Global Strike (CPGS) using high-precision conventional weapons, mainly delivered by air. Thus the aerospace attack is threat number one. And Russia's priorities are therefore nuclear weapons that can evade missile defenses, nuclear, space, hypersonic weapons, and drones (UAVs) and weapons based on "new physical principles" (to use Marshal Nikolai Ogarkov's earlier formulation). There are also many continuing references in the Russian press to the ongoing development and ultimate production of these so-called weapons based on new physical principles.⁶ Equally insistently, Putin has repeatedly demanded an increase in the quantity and quality of

Russian weapons comparable to that of the 1930s.⁷ Yet he denies that his policies are militarizing the economy and claims that he intends to avoid his predecessors' mistakes.⁸

These demands for new, advanced weapons originate in the ever-worsening threat perception that predated the invasion of Crimea in 2014. For example, Foreign Minister Sergei Lavrov told an audience at the annual 2013 Munich Security Conference that,

Even in the conditions of deficit of financial resources an increase in military activities is observed in the north and center of Europe, as if in these regions the security threats are mounting. Advancement of projects for NATO's further expansion and advancement of the bloc's military infrastructure to the East is continuing – as if there were no top-level statements on fatality of preserving dividing lines on the continent. Speaking of this, some of our European partners are now inventing new dividing lines, begin trying to artificially divide integration projects into “good” and “bad”, “friendly” and “alien”.⁹

On February 20, 2012, then Prime Minister Putin said that, “We continue to see new areas of instability and deliberately managed chaos. There also are powerful attempts to provoke such conflicts even within the direct proximity of Russia and its allies' borders.”¹⁰ Since for Putin and his subordinates Russia's borders comprise the Soviet borders we get here some sense of just how expansive these threat assessments are.

Moreover, in Russian military thinking even small wars near Russia possess an inherent tendency that could lead to their escalation into major and even nuclear wars. Thus on November 17, 2011, Chief of the General Staff General Nikolai Makarov told the Defense Ministry's Public Chamber that:

The possibility of local armed conflicts virtually along the entire perimeter of the border has grown dramatically . . . I cannot rule out that, in certain circumstances, local and regional armed conflicts could grow into a large-scale war, possibly even with nuclear weapons.¹¹

Makarov further warned that the cause for such wars in the CIS lies in NATO's advancement to the borders of the CIS and Russia.¹² Makarov echoed previous

statements by his predecessor Chief of the General Staff General Yuri Baluyevsky that while Russia faced no direct threat of aggression, “[given] the existence of nuclear weapons, any localized armed conflict—let alone a regional conflict—could lead the international community to the brink of a global war.”¹³ Makarov thus postulated the possibility of a seamless transition or even escalation process from local wars like those in Iraq after 2003, or now in Syria and Ukraine, all the way up to a theater or even strategic nuclear war. This is clearly another lesson from U.S. wars in the Middle East: they could extend (since Russia regards its strategic frontiers as the Soviet frontiers) from a local war in one of those states or closer to home in Ukraine all the way up to major theater war, possibly involving use of nuclear weapons. These remarks also indicated that Russian thinking sees two different kinds of wars that could result in nuclear weapon use as likely or at least possible.

One is the canonical Cold War scenario of direct nuclear strikes by the two superpowers on each other’s territory or domestically based forces using ICBMs or SLBMs. This, of course, is a scenario that has been extensively analyzed since the 1950s. The other, or second, and newer scenario is a regional war scenario growing out of a confrontation like Syria or Ukraine where Russia conceivably would feel impelled to go first with nuclear weapons to deter a conventional though devastating strike upon critical targets. So here tactical nuclear weapons or so called non-strategic nuclear weapons (TNW or NSNW) would be used to offset or deter against NATO or potentially China’s conventional superiority.¹⁴

Therefore, given such threat assessments, Russia must undertake a huge conventional and nuclear buildup by 2020 if not beyond.¹⁵ For example, on February

27, 2013 President Putin told an expanded session of the Ministry of Defense Collegium that,

We see how instability and conflict are spreading around the world today. Armed conflict continues in the Middle East and Asia, and the danger of ‘export’ of radicalism and chaos continues to grow in our neighboring regions. At the same time, we see methodical attempts to undermine the strategic balance in various ways and forms. The United States has essentially launched now the second phase in its global missile defense system. There are attempts to sound out possibilities for expanding NATO further eastward, and there is also the danger of militarization in the Arctic. All of these challenges – and they are just a few of the many we face – are of direct concern to our national interests and therefore also determine our priorities.¹⁶

This assessment is not just a personal or new one. Rather Putin, as suggested by his remarks above, has long argued this way and this assessment is also to be found in Russia’s new Foreign Policy Concept of 2013 . Thus in 2012, he wrote that the global economic-financial crisis is systemic and marks a transition to a new geopolitical era. As a result the world is entering into a new period of turbulence which will be prolonged and painful. Specifically,

The end result of the system that has developed in the 20 years since the collapse of the Soviet Union, including the phenomenon of unilateralism, is obvious. The former single center of power can no longer maintain global stability, while the new centers of influence are not yet ready to take over. Global economic processes and the military political situation have become increasingly unpredictable and should be dealt with through the confident and responsible cooperation of states, primarily the permanent members of the UN Security Council and the G8 and G20 countries. We must keep working to overcome mutual suspicion, ideological prejudice and short-sighted self-interest. Instead of boosting development and stabilizing the global economic system, the world’s largest economic centers are creating an increasing number of problems and risks. Social, ethnic, and cultural tensions are growing rapidly. Destructive forces have strengthened dramatically and have shown their aggressive nature in some parts of the world ultimately threatening global security. The countries that are using military force to “export democracy” often become allies of these destructive forces.¹⁷

In similar fashion that 2013 Foreign Policy Concept makes the following points:

The principal and emblematic feature of the current international landscape is the deep-seated transformation of the geopolitical landscape, the essence of which is a transition to a polycentric or multipolar world. A powerful factor in this transformation is the global economic crisis that is adding to global and regional economic and political turbulence. Consequently international relations are becoming more unpredictable and tense. The West's ability to dominate the world economic and politics continues to shrink as the center of global economic activity moves eastwards and the decentralization of international power continues with the Asia-Pacific continuing to rise. As new players emerge and the West declines there is an increase in global competition that manifests itself in increasing instability in international relations. Even as the likelihood of a large-scale and/or nuclear war is decreasing; changes are necessarily occurring in the global correlation of forces. States seek to augment their offensive potentials and develop new kinds of weapons thus eroding the structure of global security and even the system of arms control treaties. Moreover as competition grows around the sources of raw materials, their exchanges, and their markets, this source of competition could become a trigger for future conflicts (as expected in earlier Russian official and unofficial statements).¹⁸

The attentive reader will note that if one deconstructs or excavates this line of thinking it bears a powerful resemblance to Lenin's argument in his 1916 treatise "Imperialism the highest Stage of Capitalism" that purported to uncover the global economic-political-strategic forces that made for World War I. This fact does not encourage those who wish to believe that Russia has firmly stepped out of the Soviet period. Moreover, the enormous resemblance between Putin's threat assessment that now pervades the Russian elite and Soviet assessments testifies to the revival and strength of KGB and Soviet elements of Russian political culture in Russian foreign and defense policy thinking. And since we see as well strong elements of restoration of Tsarist structures, attitudes, and behaviors in Putin's policy it is clear that his assessment and ensuing policy guidance for huge military procurements are deeply rooted in Russian history and political culture.¹⁹

In addition to this Leninist or quasi-Leninist way of thinking about the strategic environment we also encounter quasi-Stalinist demands for the rapid rearmament of the

Russian armed forces to meet these global threats. In these and many other previous articles and speeches Putin or his subordinates and Russian analysts outlined the need for Russia not only to be militarily competitive but to be able to stand up and conduct an independent foreign and defense policy in the face of mounting threats.

Much like Stalin in the 1930s, Putin argued in 2013 that “the changing geopolitical situation requires rapid and considered action. Russia’s Armed Forces must reach a fundamentally new capability level within the next 3-5 years.”²⁰ On March 20, 2013 Prime Minister Medvedev seconded this demand.²¹ Medvedev argued that,

The creation of large integrated structure [in the Russian defense-industrial complex] is one of [Russia’s] top priority missions.” --- This approach has withstood the test of time, the consolidation of forces along the lines of the great variety of sectors in the military-industrial complex is necessary Medvedev indicated the restructuring of Russia’s defense-industrial complex must happen “within timeframes that are compressed to the maximum extent necessary.”²²

Stalin or Brezhnev could not have said it better. Indeed, Medvedev called upon defense industry not just to be a locomotive of economic and technological growth for the entire economy but also to grow at an annual rate of 10% in 2013-2015 and for productivity to grow at around 20% annually.²³ According to Deputy Prime Minister Dmitry Rogozin, speaking at the same venue, Russia will train around 2,000,000 technical and engineering workers for the defense-industrial complex by 2020 with a special education program and massive state subsidies to help reach these goals.²⁴ It should also be noted that Rogozin also said here that,

The Cold War rudiments both in their organization, such as NATO, or propaganda, such as Russophobia, forms have not disappeared. Western Civilization is a condition of exhausting resources and is not going to give up the level of consumption which they got [and] have been used to for a long time. This means the struggle for the access to these resources will become even more acute.²⁵

Accordingly Russia must therefore be able to organize a mechanism or institution for predicting or forecasting threats to a distance of 30-50 years and to promote the development of new kinds of weapons on the basis of that forecast. Russia must do so by establishing an analogue of the US' DARPA (Defense Advanced Research Projects Agency).²⁶ Putin also again emphasized the need to create new generations of weapons based on new physical principles (beam, geophysical, genetic, psychophysical and other technology). He also singled out cyber, information, and communications technology, noting that as high-precision weapons proliferate and become common they will become the main means for achieving a decisive victory over opponent, including in global conflicts.²⁷ Evidently these are the categories of weapons that comprise the so called asymmetric strategy.

Under the circumstances, and confronted by threats outlined below the armed forces must follow a deterrence strategy and prepare for a quick and effective response to challenges, i.e. be ready for anything on the spectrum of conflict. Even so, nuclear weapons and thus deterrence, mainly of the US/NATO but also of China, in both the strategic and regional deterrence contingencies will remain the priority until and unless Russia can field high-tech competitive weapons. Subsequent directives regarding procurement have followed along these lines. Thus as of today nuclear weapons are the priority. Indeed, Russia is producing nuclear weapons of so many different types in new weapons and extending older ones that, given present production rates, Russia will reach the New START Treaty numerical limits by mid-2018 vastly increasing its nuclear component.²⁸

Moreover, Russia is not only building new nuclear weapons it is extending the

life of many of its older systems, procedures that raise the question of why it is doing so and for what purpose?²⁹ In addition, given the procurement priorities we see and the rhetorical if not doctrinal readiness to resort to nuclear strikes in a first-strike and possibly even preemptive mode if necessary we see that Russia's nuclear and high-tech arsenal functions, as does China's as an anti-access and area denial (A2AD) strategy par excellence.³⁰ Thus Moscow's deployment of nuclear and conventional weapons indicates that it believes the former deter not only nuclear but conventional attacks, a mode of strategizing and thinking that directly rebuts the complacent and groundless notion here that nuclear weapons only deter other nuclear weapons. For Russia both sets of weapons are intended to deter the U.S. and/or NATO aerospace attacks (as Russia calls it) thereby allowing Russia to operate within the umbrella of its potent integrated air defense system (IADS). The precedent of the Egyptian Army operating in the Sinai Desert for limited war aims under its IADS in the Yom Kippur War of 1973 to negate Israeli air superiority and shatter Israeli strategy and the Serbian withholding of its air defense network in Kosovo in 1999, forcing NATO to bomb it for 78 days to get a decision are of crucial significance here and repay careful study.

This defense program has continued despite the structural pathologies of Russia's overall economy from which the defense sector is by no means immune. And it has carried forward despite sanctions and recession, not merely stagnation, since 2012. So while there is talk of impending budget cuts, it is by no means certain at this time (October 2016) that they will be instituted or implemented. If anything there are many signs that the defense priority will remain sacrosanct for the foreseeable future and that the Russian economy, even under conditions of long-term crisis, can sustain a robust

defense sector that can give Putin much, if not all, of what he wants.³¹ If anything more draconian repression and mobilization of the state may allow Russia, particularly if sanctions are lifted or energy prices rise, to gain time and space for more economic maneuverability to continue with what is clearly a program of “structural mobilization” – a term coined by the late military analyst Vitaly Shlykov -to describe the Soviet economy.

At the same time this overall modernization program is occurring as the first signs of what might be considered the next revolution in military affairs (RMA) are manifesting themselves in such fields as 3-D manufacturing (additive printing) robotics, hypersonics, UAV’s potential biogenetic weapons, artificial intelligence (AI), and the like. These systems are already transforming global economics and their impact on the international economic and military order can only grow.³²

Not surprisingly, Russian military thinkers have already begun to factor such weapons into their calculations concerning contemporary and future war while the defense sector is already trying to manufacture competitive weapons using these new systems. For example, according to Colonel S.G. Chekinov in future wars electronic warfare will become an independent operation in its own right, not just a support operation. Likewise, we can expect further technological breakthroughs in next age generation weapons that will combine physical, informational, psychological, and even biological weapons in combat over vast areas, including outer space, i.e. multi-dimensional warfare.³³ Remote operations will occur as much as direct force on force missions, the battlefield will be transformed into a “combat environment” concept, including virtual targets and the enemy’s entire range of psychological orientations and

capabilities.³⁴ Chekinov and Lt. General S. A. Bogdanov (RET) have subsequently argued that information weapons already can actually tackle strategic tasks such as disorganizing enemy military and state control, and the aerospace defense system (which Russian writers expect will be the first target in a conventional offensive), deceiving the enemy, creating the desired public opinion, organizing protests against the enemy government, and launching other operations aiming at reducing the enemy's will to resist.³⁵ Indeed, they agree that today the focus of both interstate and intra-state confrontation is turning towards non-military means, including informational means, not least because of the danger of mutual annihilation in a nuclear conflict.³⁶ But this also means that new technologies can generate what they call climactic weapons, and that new methodologies can induce dozens of different pathways for psychologically manipulating and controlling an enemy to follow a prescribed course of ultimately self-destructive actions (this sounds like the old Soviet concept of reflexive control). The supposed next generation of weapons that could combine psychological, informational, and even biological attributes and will be based upon "new physical principles" exemplifies this trend. Along with a plethora of Russian officials from Putin down they charge the US with developing and deploying these methodologies in the color revolutions in Georgia, Ukraine, Central Asia and elsewhere.³⁷

Biological and Chemical, Weapons

Based on Russian combat activities in Chechnya and in Syria there is reason to believe that Russia might not hesitate to use chemical weapons, including thermobaric weapons against less well-armed opponents, for in Syria there are reports of Russian use and we know that in Chechnya Moscow employed thermobaric weapons.³⁸ Indeed, Igor

Sutyagin of RUSI reports that flamethrower elements are being introduced into the structures of every Russian combined arms formation as well as into chemical, biological, radiological, and nuclear defense brigades.³⁹ The presence of such brigades in itself testifies to the Russian expectation that nuclear, biological, chemical, and/or radiological weapons may well be used in future wars involving its forces. Such activities should raise questions about Russia's adherence to the 1925 Chemical Weapons Convention of 1925. But the use of chemical or possibly biological weapons, (BW) including new BW and chemical weapons, e.g., chemical warfare robots yet to be deployed or even invented, would not be a stretch. Indeed, the latter project is already underway.⁴⁰

First, we do not know whether or not research and/or development of new biological techniques, based on genetic manipulation that would create new weaponized strains of bacteria and viruses developed after the 1992 closure of the Soviet BW program is continuing. Such weapons could interfere with immunological processes or genes that control behavior and r this kind of research was at an advanced stage in 1991.⁴¹ Second, as noted above Putin has called for new generations of weapons based on "new physical principles" that include, beam, and geophysical, genetic, psychophysical and other technology.⁴² Third, once Putin was "re-elected" as president in 2012 the Ministry of Defense pledged itself to begin working on the creation of weapons based on these new physical principles, and certainly genetic weapons, as listed on the ministry's website fall into those categories of weapons. Fourth, tripartite negotiations on BW among the UK, US, and Russia, have long since broken down.⁴³ Consequently there is great concern that new labs and institutes or for profit corporations might base their work on the Soviet research program and move forward to R&D on so-called "third

generation” BW programs.⁴⁴ Given the range of our ignorance as to developments inside Russia that is deliberately fostered as well by Russian opacity and refusal to be transparent or collaborative on these issues. It is not surprising that some experts “presume” that there is an ongoing BW R&D program currently operating in Russia.⁴⁵

Another example of weapons development based on new physical principles is the Russian campaign to build and deploy hypersonic weapons. Indeed, the list presented above of current Russian nuclear programs includes some hypersonic weapons systems, e.g. a new stealthy heavy bomber that will carry cruise missiles and reportedly hypersonic missiles. But in addition the Project 4202 vehicle that is to be delivered by the SS-19 Stiletto missile is also intended to be hypersonic.⁴⁶ Hypersonic vehicles or alternatively boost-glide vehicles travel at speeds between Mach 5 and Mach 10 (3840/MPH to 7680MPH) use sophisticated technologies for maneuvering and boost that allow them to deliver warheads rapidly, evade defenses and target precisely. This allows for high rates of survivability against missile defense systems. These qualities are what excite Russian designers and planners because Moscow fully believes that the U.S. ballistic missile defense system now being built in Europe and Asia aims, despite all abundant evidence to the contrary, to neutralize Russia’s nuclear strike capability against Europe and the U.S. Therefore the obsession –not too strong a word here—of Russian leaders is to build supposedly invulnerable nuclear weapons like hypersonic that cannot be attacked by missile defenses.⁴⁷

Development of such weapons goes a long way towards confirming that Moscow wants to hold the U.S. itself at risk of nuclear strikes and sees military utility in nuclear weapons as warfighting instruments. The 2015 tests of the Project 4202 weapon

comprised tests of what Russia calls the Yu-71 hypersonic Attack aircraft that supposedly could reach speeds of 7000 MPH. It also can be used not just as a warhead for the SS-X-30 (Sarmat) but also can be adapted for the Russia's advanced long-range strategic bomber.⁴⁸ But in 2016 Moscow apparently tested the Yu-74 hypersonic attack aircraft, evidently carried by the SS-19 Stiletto ballistic missile system. Evidently these gliders are to be loaded onto the new Sarmat or SS-X-30 state of the art ICBM that can carry up to 24 nuclear loaded Yu-74 gliders and can hit any target with a 6200-mile radius in an hour.⁴⁹ Each Yu-74 glider can be equipped with a nuclear warhead and/or electronic warfare (EW) application or false target simulators to ensure penetration of any missile defense system and thus raise significantly the efficiency of Russia's Strategic Missile Forces.⁵⁰ The search for missile penetration systems to break through any missile defense by means of the use of new kinds of weapons with hypermodern technologies for maneuverability also helps explain the modernization of old systems like the SS-19 Stiletto that can serve as launchers for these warheads.

But beyond deploying weapons with missile penetration capabilities, Russia is also clearly not just MIRVing its weapons it is also building medium or heavy-class weapons because the New START treaty does not impose any penalties or prohibitions for doing so unlike START-1.⁵¹ Moreover, these plans for countering the U.S. BMD program go back at least to 2004 when it was just being announced. At the same time these systems are clearly part of the asymmetric procurement strategy devised already at that time by Putin. As the late Alexander Savelyev wrote in 2008,

Russia declared that it would undertake effective "asymmetric" counter-measures in order to reduce this threat (of missile defenses-author) and to make the strategic situation more stable. One of these measures is to target the elements of the ABM system in Europe with Russian strategic missiles. Alongside with this,

some experts and even military officials, including the chief of the General Staff of the Russian Armed Forces, General Yuri Baluevsky, made rather straightforward statements about the possibility that Russia would withdraw from the INF treaty as a reaction and counter-measure to the deployment of an American ABM system in Europe.⁵²

Meanwhile allegedly the project to create hypersonic air-launched cruise missiles (ALCM) that are quite similar to the Yu-74 is also entering its final phase.⁵³

Lastly,

Ostkraft analysts emphasize that the Yu-74 gliders would not only evade NATO's missile defense systems but will be also capable of penetrating through the US THAAD shield. The analysts argue that while the Terminal High altitude Area Defense (THAAD) system is effective in intercepting outdated R-17 Elbrus tactical ballistic missiles, it is potentially vulnerable to the threat posed by advanced missile systems.⁵⁴

Of course, if that is really the truth and Moscow can breach THAAD then it remains a mystery why Moscow, if not Beijing are so upset that South Korea, which clearly faces a serious missile and nuclear threat from North Korea, opted to join the U.S. THAAD network.⁵⁵ Similarly, and in keeping with the idea that nuclear and futuristic weapons are regarded as much for their power to intimidate as for their actual capabilities, it is not unusual to encounter statements of this kind in the Russian media even as Moscow endlessly fulminates that it is under threat from the U.S. and its allies. Indeed, the following statement tangibly manifests the combination of overcompensation and groundless boasting to intimidate on the one hand with ingrained paranoia of the Russian leadership on the other.

The Russian military are about to test the first prototypes of the S-500 Prometey air and missile defense system also known as 55R6M Triumfator M – capable of destroying ICBMs, hypersonic cruise missiles, and planes at over Mach 5 speeds; and capable of detecting and simultaneously attacking up to ten ballistic missile warheads at a range of 1300KM. This means the S-500 can smash ballistic missiles before their warheads re-enter the atmosphere. So in the case of Rand-style NATO pussyfooting, the S-500 would totally eliminate all NATO air power

over the Baltic States- while the advanced Kornet missile would destroy all NATO armored vehicles. And that's not even considering conventional weapon hell. If push came to nuclear shove, the S-400 and especially the S-500 anti-missile missiles would block all incoming US ICBM's, cruise missiles, and stealth aircraft. Offensive drones would be blocked by drone defenses. The S-500 practically consigns into the dustbin stealth warplanes such as the F-22, F-35, and the B-2. The bottom line is that Russia – in terms of hypersonic missile development – is about four generations ahead of the US, if we measure it by the development of the S-300, S-400, and S-500 systems. As a working hypothesis, we could describe the next system- already in the drawing boards –as the S-600. It would take the US military at least ten years to develop and roll out a new weapons system, which in military terms represents a generation. Every Pentagon planner worth his pension plan should know that. Russian – and Chinese- missiles are already able to knock out the satellite guidance systems for US nuclear tipped ICBMs and cruise missiles. They could also knock out the early alert warnings that the satellite constellations would give. A Russian hypersonic ICBM flight time, launched, for instance, from a Russian nuclear sub all the way to the US East Coast, counts for less than 20 minutes. So an early warning system is absolutely critical. Don't count on the worthless THAAD and Patriot to do their job. Once again Russian hypersonic technology has already rendered the entire missile defense system in both the US and Europe totally obsolete. **So why is Moscow so worried by the Pentagon placing the Aegis system so close to Russia's borders? A credible answer is that Moscow is always concerned that the US industrial-military complex might develop some really effective anti-missile missiles even though they are now about four generations behind.**⁵⁶

This long citation graphically combines the mendacity common to Russian propaganda with the paranoia that pervades the government and IW activity but also epitomizes the use of false information about Russian military that is disseminated precisely to intimidate or impress foreign audiences.

The actual state of affairs is quite different. Moscow's investment in hypersonics occurs not just because the U.S. and China are doing so as well but also because the capabilities that the U.S. and presumably China are now developing frighten Russia no end. Specifically, Moscow knows it has no real defense against the U.S. Conventional Prompt Global Strike (CPGS) program that is a purely conventional long-range global strike capability using hypersonics. It also fears that the BMD network now being built

in Europe and Asia, including THAAD, can neutralize its first-strike nuclear capability despite the laws of physics and abundant U.S. briefings to the contrary. If both these programs are used together Moscow believes Washington could decapitate its C3I by conventional means while the BMD system neutralizes any hope of a retaliatory nuclear strike.⁵⁷

Statements by senior officials abundantly make Russia's fears and apprehensions clear. Special envoy Grigory Beredennikov, in February 2015, not only denounced the U.S. missile defense program for upending deterrence because it would supposedly give Washington the illusion it could strike Russian nuclear systems or their C3I with conventional weapons and use the BMD network to neutralize a second strike, and thereby overcome the deterrence relationship between Moscow and Washington, he also went further, reiterating that for Moscow strategic stability depends on a host of non-nuclear factors as well. Specifically he stated,

We are prepared for a dialogue about further nuclear disarmament steps. At the same time, we are convinced that they are impossible without solving such problems as the unlimited growth of global U.S. missile defenses, the project of using strategic weapons with conventional warheads within the concept of "global strike" --- the refusal of the United States to pledge not to deploy weapons in space, [and] the growth of qualitative and quantitative conventional imbalances.⁵⁸

This is why Moscow constantly inveighs against BMD in Europe, the CPGS, and U.S. hypersonic programs, all of which, individually, or taken together, would explode strategic stability as Moscow defines it.⁵⁹ As Amy Woolf of the Congressional Research Service observes,

Russian officials have expressed a number of concerns about U.S. conventional prompt global strike capabilities and their implications for strategic stability. They have argued that these weapons, even if armed with conventional warheads, could threaten critical targets in Russia and even threaten Russia's strategic

nuclear forces if the United States deployed large numbers of missiles armed with highly accurate reentry vehicles. This might provide the United States with the capability to undermine Russia's nuclear deterrent, without resorting to the first use of nuclear weapons, and might actually increase the likelihood of a U.S. attack against Russia. Moreover, even if Russia were not the target of an attack with these missiles, it might not know whether the missile carried a nuclear warhead or a conventional warhead, or whether it was headed towards a target in Russia. Finally, some Russians have argued that the United States might replace the conventional warheads with nuclear warheads to exceed the limits in a treaty.⁶⁰

These Russian concerns are a major reason why beyond development of both nuclear and conventional hypersonic weapons like the projected sixth generation hypersonic fighter that will be both a hypersonic system and carry hypersonic missiles; Russia is also developing "next-generation" air defenses against the expected U.S. and/or NATO/Chinese hypersonics.⁶¹ But even though Moscow is developing such defenses it is clear that its main thrust is to develop offensive strike capabilities that can threaten not just Europe but the continental U.S. and manifest a desire to use nuclear weapons as warfighting weapons, not just as deterrents against conventional or nuclear attack. And this procurement policy, even if it is outrunning doctrinal efforts to regulate procurements in service of a coherent strategy has its own logic, as we have shown above, namely controlling escalation processes and dynamics through all phases of any crisis.

The EMP Threat

Scientists and experts on Russian military affairs have long manifested concern about Russian intentions and capabilities with regard to a potential EMP weapon (Electro-magnetic Pulse). Such a weapon would appear in the form of a nuclear bomb detonated high in the atmosphere. If detonated this weapon would destroy virtually all electronic installations within hundreds of miles of the blast as was already discovered in Soviet tests in the 1960s.⁶² The cascading breakdown of electronic-dependent

infrastructures would not only damage large amounts of our infrastructures and cause substantial casualties, it would also attack U.S. satellites in low earth orbit (LEO) and in higher ranges of the atmosphere.

Moscow began experimenting with EMP in the 1960s. Since then, the Commission to assess the threat from EMP weapons met with Russian generals Belous and Slipchenko, who said that Russia had already ‘designed an enhanced EMP nuclear weapon, that Russian, Chinese, and Pakistani scientists working in North Korea could enable the DPRK to develop such a weapon that would threaten the entire world.’⁶³ Thus an EMP attack could put the entire electric grid of this country at risk. And it could threaten the entire network of satellites and ground stations connected to them. The human and military dimensions of this threat are therefore exceptionally high even if it is by no means clear yet that Russia actually has a usable EMP weapon and/or the strategic intention to use it under certain circumstances. As William Graham, Chairman of the EMP commission, testified to Congress,

Although EMP was first considered during the “Cold War” as a means of paralyzing U.S. retaliatory forces, the risk of an EMP attack may be greater today than during the Cold War, as several adversaries seek nuclear weapons, ballistic missiles, and asymmetric ways to overcome U.S. conventional superiority using one or a small number of nuclear weapons. The electromagnetic fields produced by weapons deployed with the intent to produce EMP have a high likelihood of damaging electrical power systems, electronics, and information systems upon which American society depends. Their effects on critical infrastructures could be sufficient to qualify as catastrophic to the nation.⁶⁴

Graham also observed that beyond holding our society at risk of a catastrophe, these weapons could be used by an adversary at a time and place of his choosing. He further noted that Russian scientists reported that during their exo-atmospheric tests of these weapons in the 1990s over a site in Central Asia, they tested 300 KT weapons at

ranges from 60-300 Km above the site and this lead to widespread damage to the entire electric complex over a distance of 600Km.⁶⁵

Congressman Roscoe Bartlett (R-MD) was told in 1999 by the chairman of the Duma's International Affairs Committee, Vladimir Lukin that "if we really wanted to hurt you with no fear of retaliation, we would launch an SLBM and detonate a single nuclear warhead at high altitude over the United States and shut down your power grid and communications for six months or so." Echoing this comment Duma member Alexander Shabonov said "and if one weapon wouldn't do it, we have some spares."⁶⁶ Therefore we have excellent reason to believe that not only are these weapons among the overall Russian nuclear inventory but that since then Russia has continued to work on creating an EMP weapon that could be used with impunity and could direct energy at the target from laser, x-ray, microwave radiation, neutron radiation, electromagnetic shockwaves etc.⁶⁷ Since 1999 reports have appeared in the Russian press affirming the capability of nuclear weapons to produce very high levels of EMP over a high large area and of Russian discussions of the utility of such weapons against the United States.⁶⁸ There are also grounds for concern that relevant technologies for EMP weapons have leaked from Russia to producers like North Korea, or Pakistan, or Iran.⁶⁹

Similarly James Howe reports that,

Russian nuclear laboratories have been researching the development of qualitatively new types of nuclear weapons, and Russian industry is developing new missile delivery systems. Examples of these are the Drone intercontinental range torpedo recently reported in the press, with a multi-megaton warhead for destroying naval bases and ports; Precision, low-yield, "clean" nuclear weapons that were earlier described; Russia has stated that they could use EMP weapons without precipitating nuclear war-- "discrete" EMP weapons may only cover an area of 10's of kilometers. Russia also has neutron weapons, which are significantly more effective than US neutron weapons. It is apparent that Russia is developing a spectrum of nuclear weapons with tailored effects and the means

to deliver them which can maintain escalation dominance all along the conflict spectrum – from “de-escalating” conflicts to conducting theater/strategic warfare for vital national objectives to major nuclear warfare up to the most destructive levels where the survival of the state is at risk.⁷⁰

In the same vein,

Explosively driven non-nuclear EMP in a ~2,000 lb. class bomb can kill all electronics and destroy circuits up to 400-500 m. Repetitively pulsed EMP warheads in a cruise missile can attack many targets, or repetitively attack one or a few targets. There is global research into highly energetic warheads that have the power of 10-1000 X TNT. At 30-40 X TNT a 1000 lb. WH would have the power of destroying most targets of interest, including hard and deeply buried targets if a penetrator is used. A 1000 lb. bomb with explosive power 120 X TNT would have a 750ft lethal radius, and a 250 lb. bomb with a WH 1000 X TNT would cover 4 square kilometers with lethal effects.⁷¹

It therefore seems clear that Moscow is attempting to fabricate usable EMP weapons as part of its nuclear weapons program and is not shy about advertising the threat even if it is not yet usable – this being a classic Soviet psychological warfare ploy to intimidate Western audiences and inhibit them from challenging Russian operations. But even if they are not yet usable or circumstances do not warrant using them, it is incontrovertible that Moscow has long explored the inherent potential of EMP weapons and may well have several versions of them in its inventory.

UAVs (Drones)

Unmanned vehicles have become a global weapon of choice, not just an American or Russian one. We have seen substantial deployments of UAVs in the Middle East, in Arab-Israeli wars as well as US combat operations, and now in Syria and Ukraine. Moreover, drones are not only being used in the air but are also being developed for underwater operations so we now see unmanned underwater vehicles (UUVs). Indeed, some 80 countries already have drones or UAVs and this number, along with the number of countries possessing UUVs will also grow.⁷² Even ISIS has

drones and is working on making and improving them.⁷³ In addition drones have apparently been used by Azerbaijan who evidently is making UAVs, in its latest operations in Nagorno-Karabakh.⁷⁴ Thus these vehicles are already ubiquitous and battle-tested, i.e. in terms of their utility for combat operations.

So besides the relatively low cost and the diffusion of technology and knowhow these weapons possess both combat and commercial capabilities that make them attractive to Russia and other governments. For example, Rubin Central Design Bureau for Marine Engineering is now working on a design for UUV submersibles to support Arctic drilling and mining operations. And at the same time Russia is also building a UUV nuclear-armed submarine that could target U.S. harbors and coastal cities.⁷⁵ This particular nuclear weapon could be the STATUS-6 that Putin displayed on television in November 2015 that could “create an extensive zone of radioactive contamination” along the enemy’s coastline rendering it uninhabitable for a long time.⁷⁶

These reports suggest that Russia still (as the STATUS-6 is apparently an old Soviet dream) entertains the idea of counter-value targeting, i.e. targeting European, American, and Asian cities and population centers rather than counterforce targeting of weapons centers and bases. Second, it shows that not only can drones, at least in theory be nuclearized, but also the display of this projected weapon on television epitomizes the use of nuclear weapons to intimidate and as a weapon of IW.⁷⁷

The possibilities of combining nuclear and UAV or UUV technologies together are likely to increase as drone technology diffuses and as smaller yield nuclear weapons become possible. Moreover, the advent of drones is part of a much larger process of technological change or transformation as robotics, additive or 3D printing comes into

being.⁷⁸ Thus weaponization and new combinations of weapons based on these new physical principles are absolutely likely and, as the STATUS-6 program shows will be nuclearized if necessary. Indeed, this militarization process is also coming about because UAVs and UUVs are the perfect embodiment of the concepts articulated by former Chief of the General Staff, Marshal Nikolai Ogarkov (197-1994), 1977-84. Clearly these systems embody the concept of a reconnaissance-fire system at the tactical level and of a reconnaissance-strike network at the operational or strategic level while saving manpower and heightening precision. Moreover, even if Russia is some distance behind the U.S. in the capability of its UAV's and UUVs, their use in both conventional and potentially nuclear scenarios embody not just the aggressiveness of Russian operations, but their offensive and intimidating quality. One recent commentary on drones duly notes that,

James Holmes summarized the situation of what to do with intruding unmanned systems well when he described such operations: "In effect they dare you to escalate." As such, the use of unmanned systems could favor those seeking the offensive, intrusive use of such systems for political purposes. Particularly actors with significant military powers and the upper hand could play this game of dare-to-escalate. They could engage in a game of maritime bluff, where they seek to outmaneuver opposing actors with lesser military capabilities, challenging them to contest their actions and power.⁷⁹

The resemblance of affinity between this kind of behavior and the Russian nuclear strategy described above should be obvious.

Thus Russia is using and improving its existing drones, building robots, moving into the 3-D printing age, and even apparently experimenting with lighter than air aerial vehicles, some of which were allegedly spotted in Syria, and in nuclearizing them where possible.⁸⁰ What this means, especially in the context of Russia's advanced cyber-warfare capabilities, is that Russia, like other states, is working assiduously not just to

keep pace with technological changes in warfare, but also endeavors to narrow Washington's technological lead or counter it through innovative tactical concepts. It duly aims to negate the U.S. aerospace precision attack, including the use of UAVs, and the information networks embedded in them that make them so potent a weapon. Consequently UAVs if not UUVs are conceivably becoming targets of Russian air, air defense, UAVs, and cyber-strikes.⁸¹ For example, Russia is now developing so called "Kamikaze" drones that will be strike platforms, not just reconnaissance systems that carry visual and radar observation instruments. These drones will carry those but also guided missiles as well. They will resemble the airplanes used by Japan for its World War II Kamikaze missions and be packed with explosives or missiles and, given their cheapness can inflict damage well out of proportion to their cost and their loss would obviously be of relatively little consequence.⁸² And Russian scientists apparently recently succeeded in creating and testing under laboratory conditions "a neural interface which allowed an unmanned aerial vehicle to be operated using brain impulses."⁸³

UAV Missions

The nuclear and strike missions and capabilities of UAV's and UUV's do not exist at present but Russia is clearly working on them. Meanwhile we can see that they are already being deployed for discernible combat missions as shown in their deployments, exercises, and actual operations. Russia already uses UAV's for navigation, mapping, and ecological investigation of the Arctic as well as Search and Rescue missions there.⁸⁴ In February 2016, Russia conducted "anti-terrorist" drills on the Kuril Islands, in which unspecified UAVs located "scattered" simulated enemies. Mechanized infantry and air assault units then destroyed, with artillery support. This is another strong indicator that

UAVs are not artillery spotters *alone*, but rather are integrated into combined arms tactics. On top of the “anti-terrorist” label, other mentions of “combined arms” in the Mid-East suggest that the Special Forces are utilizing drones in this in Syria. Indeed, the evidence suggests that drones have been used in Syria to strengthen the strike capability of Russian aircraft. Or in other words, they are the reconnaissance element in the reconnaissance fire or strike complexes we have alluded to above.⁸⁵

Meanwhile, in Ukraine, Russian UAV deployments in Ukraine provide tactical advantages to ground forces on a level that Ukraine’s government cannot match. In March 2015, Defense One reported that “Groups like DPR use highly sophisticated Russian-made unmanned aerial vehicles, or UAVs, to collect data to target missiles and artillery fire, which has proven to be an enormous advantage on the battlefield.” And the Russian forces along with the separatists they back possess “the latest and most sophisticated signal jamming and GPS-spoofing technology from suppliers like the Moscow-based Radio-Electronic Technologies Corporation, or KRET, and expensive, truck-based anti-aircraft [jamming] systems like the Krasuka-2.”⁸⁶ In addition the Russian and Russian-backed militias often carry handheld micro-drones which survey tactical space nearby – this has allowed them to quickly direct artillery and mortar fire to devastating effect on Ukrainian troops. A Fort Leavenworth assessment found that “A UAV-to-attack pattern is emerging in the [Donbass] region.”⁸⁷ Ukrainian troops generally report that, once they see Russian mini-drones, “they know in the next 10-15 minutes, there’re going to be rockets landing on top of them...[not] precision fire, but heavy bombardment.”⁸⁸ Finally, Russia appears to be emphasizing use of UAVs to reconnoiter urban and industrialized areas.⁸⁹

In addition UAVs in Ukraine have been used to wage electronic and information war on other UAVs, this being a particular Russian tactic to degrade or “spoof” Ukrainian UAV’s.⁹⁰ The mass use of UAV’s also shows that the air space in Ukraine already is and will be quite congested, making complacent predictions of untrammelled NATO air superiority in Eastern Europe rather more dubious than NATO would like to believe.⁹¹ This war also showcases the highly sophisticated electronic warfare capabilities that Russia already possesses and in general shows that for UAV’s (and presumably UUVs) wherever they may be deployed and by whomever, are subject to sophisticated countermeasures of an electronic or informational nature. In general the proliferation of unmanned vehicles and of the capabilities they possess, along with the capabilities to attack or defend them using other unmanned vehicles appears to be outrunning the progress in operational and doctrinal concepts that may guide their use.⁹² Nevertheless UAVs in general and Russian UAVs in particular will continue to refine and improve their capabilities and become much more potent weapons on the transformed battlefield of contemporary warfare.

Towards the Next Revolution in Military Affairs

The movement towards UAVs and hypersonics, not to mention the quest for weapons based on “new physical principles” –biological or otherwise –is not confined to Russia and betokens a broader global process that is currently underway. For our purposes we may call this revolutionary process a second or new RMA. Russian experts and leaders are already aware of these trends. For instance, Russian writers have previously written about the potential results of combining biological with kinetic or cyber weapons to affect targets’ psychology and behavior. This revolution also

comprises weapons based on hypersonics, advanced UAVs that will possess capabilities beyond those currently extant, and such new tendencies as 3-D or additive printing, robotics, artificial intelligence, (AI), lasers, indoor farming, renewable energy sources, and composite materials to mention only a few existing trends that are already revolutionizing the global economy. These trends are already exerting a revolutionary influence upon the global economy. Thus Klaus Schwab, founder and executive chairman of the world Economic Forum at Davos has written that,

The speed of the current breakthroughs has no historical precedent. When compared with previous industrial revolutions, the Fourth is evolving at an exponential rather than a linear pace. Moreover, it is disrupting almost every industry in every country. And the breadth and depth of these changes herald the transformation of entire systems of production, management, and governance.⁹³

Inevitably this revolution will affect the making of war just as the existing RMA has done. And accordingly there is reason to believe that the U.S. is well placed to lead in this technological process and for Russia to bear the continuing burden of its structurally determined economic stagnation. In turn, that suggests that Russia will have to once again develop innovative stratagems, tactics, and combinations to keep up with the pace of change but as we have seen this is hardly beyond Russia's capacity given its historical experience. Indeed, Moscow, as noted above is already developing or experimenting with hypersonics and UAVs, and concepts if not actual prototypes of biological-neurophysical or psychological weapons.

For example, the Russian defense analyst Anatoly Tsyganok, head of the Military Forecasting Center in Moscow, in 2012 opined that new weapons of the future would consist of high-speed kinetic weapons, beam weapons using directed energy, lasers, electromagnetic weapons, infrasonic weapons below 16Hz geographic weapons where

submarine carry out explosions in the troughs of the oceans or geomagnetic radiation weapons.⁹⁴ Similarly Putin allegedly stated that Russia was working on weapons that could elevate human beings' temperature to intolerable levels and that those weapons could serve as "entirely new instruments for achieving political and strategic goals.". Putin also stated that, "Such high-tech weapons systems will be comparable in effect to nuclear weapons, but will be more acceptable in terms of political and military ideology."⁹⁵

Since then, as noted above it is clear that Russia is working on hypersonic weapons that will be deployed by 2020, including the launching of an SS-19 ICBM upon which the hypersonic warhead is mounted and which can evade any conceivable missile defense.⁹⁶ Russia is also working on a sea-based hypersonic cruise missile that travels at Mach 6 speed to destroy sea and land targets as well as a Tsirkon- named hypersonic submarine-launched cruise missile but which will eventually be able to be fitted to coastal missile launchers, surface vessels, and aircraft as well as nuclear submarines.⁹⁷ Typically some analysts even believe that investment in technologies like hypersonics will not only advance Russian military capabilities and the defense sector but also become "the backbone" of Russia's overall economy.⁹⁸ Other examples of Russian efforts to compete in these new areas involve combining sources of power. For, example in Ukraine, which now serves as a military laboratory, Russia is clearly working to devise cyber and/or electronic capabilities to use in attacking UAVs. "Close observers of Russian operations in Ukraine have noted that this effect is brought about through 'not just cyber, not just electronic warfare, not just intelligence but ---really effective integration of all these capabilities with kinetic measures."⁹⁹

Space provides another domain whereby such combinations may be deployed to lethal effect. Moscow is considering developing so called “jammer” satellites to conduct EW in space or from space that will use nuclear power plants, making an attack on them a precipitating factor in nuclear war and radiation in space.¹⁰⁰ Russia is also continuing to build upon Soviet work on anti-satellite weapons, presumably also involving “new physical principles” or innovative combinations of existing technologies.¹⁰¹ These programs confirm US anxieties about both Russian and Chinese plans to target space as a theater of war.¹⁰²

Meanwhile Russia is hardly ignoring electronics and lasers. In August, 2016 Deputy Defense Minister Yuri Borisov claimed that Russia had already put some laser weapons into service, apparently referring to an airborne laser on the base of an IL-76 military transport aircraft that could destroy with radiation enemy optical-electronic systems and various kinds of weapon-control sensors on combat aircraft, satellites, land-based and marine equipment.¹⁰³ In electronics, Russian scientists claim to have discovered a series of unique compact generators that can produce high-energy pulses of hundreds or even thousands of megawatts that could clearly be used for EMP weapons.¹⁰⁴ Other Russian scientists claim that they have created a series of small suitcases that can instantly deactivate all the electronic components of enemy weapons systems using radio electronic components.¹⁰⁵ However, none of these claims have been deployed or been observably verified. Nevertheless they do indicate the kinds of capabilities Russia hopes to acquire for use against U.S. and allied militaries and civilians.

Conclusions

The foregoing analysis conclusively demonstrates Moscow's determination not just to keep pace with Washington but also to deny it the opportunity to employ those capabilities that have featured prominently in US planning for a generation, e.g. the independent aerospace operation. Moreover, it suggests Moscow is considering the possibility of employing nuclear weapons not only as warfighting systems but also even in countervalue modes. At the same time as Russia is moving to embrace what will likely be the next or second RMA it also has moved to consider the possibilities of organizing its armed forces and entire state and society for purposes of fighting not short wars that confront the West with *faits accomplis* and prominently feature nuclear deterrence to the active contemplation of long-term prolonged wars that involve the mobilization of the entire state and society, along Soviet and Stalinist lines, for such wars against the expected Western attack.¹⁰⁶ Although Moscow likes to claim it is merely defending itself against American unilateralism and threats, it is clear that international conventions and agreements like those on chemical weapons, or the movement away from countervalue nuclear weapons count for little or nothing in Russian strategic practice. Neither can we rely on the accuracy of Russian perceptions of strategic trends or of the opportunities presented to it as the Donbass debacle shows. As major military actors and even minor ones hurtle into what will almost be a new period of even faster technological change and accelerating military capabilities, failure to grasp what Moscow is doing and why will be, to paraphrase Talleyrand, worse than a mistake and thus a crime.

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