



Russia's Missile Development: Potential and Limitations

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Russia's development of missile capabilities, including hypersonic weapons, is intended to overcome the U.S.'s global conventional advantage. More advanced armaments can be used as a bargaining chip in negotiations on new restrictions, such as barring the deployment of weapons in space. At the same time, with a lower military budget than the U.S., the Russian authorities are afraid of entering a costly arms race, especially those involving defensive systems.

In 2018, Russia's defence budget was about \$63 billion (RUB 2.7 trillion), much less than the U.S. (\$712 billion) or China (\$168 billion). However, in 2018, from a budget surplus, Russia allocated for the development of modern weapons—with primarily offensive capability—the equivalent of over \$15 billion. Moreover, the classified part of the budget, which includes armaments expenditures, in 2019 is estimated to be almost \$46 billion. The amount of the Russian and Chinese expenditures on the development of hypersonic weapons is not known but the U.S. will allocate about \$2 billion for this purpose in the coming years.

The Nuclear Triad. Strategic nuclear systems with a range of over 5,500 km have the priority under Russia's rearmament plan. In accordance with the limits of the New START Treaty, in February 2018 Russia declared it had 779 intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs) and strategic bombers, of which 527 were in combat readiness, and 1,444 nuclear warheads.

At the beginning of 2018, Russia had about 313 ballistic missiles, of which 165 were mobile-based. In the coming years, with modernisation of its arsenal, Russia will have three types of missiles: Topol-M (NATO: SS-27 Mod 1), Yars (SS-27 Mod 2), and Sarmat (SS-30), which will enter into service in 2019. Russia is also testing the 9M730 Burevestnik (SSC-X-9), an intercontinental nuclear-powered, nuclear-tipped cruise missile with virtually unlimited range and which probably could carry nuclear warheads. Its sea potential is based on the slowly withdrawn R-29R missiles (SS-N-18) and their modern upgrades, the Sinieva / Layner (SS-N-23) and Bulava missiles (SS-NX-30). They are deployed on 13 submarines. Russia also has 76 strategic bombers.

Kalibr Medium Range System. In response to the suspension and termination of the INF Treaty by the U.S., Russia announced, among other things, the creation of a land-based launcher for Kalibr missiles. This can happen quickly because the existing medium-range ground-based cruise missile—the 9M729 (SSC-X-8)—is probably adapted to the platforms of the modified Iskander system. According to the U.S. and other NATO countries, its potential range is about 2,500 km, which violates the provisions of the INF Treaty. Russian President Vladimir Putin declared that he would not decide to deploy medium-range missiles in the European part of Russia unless such systems appear in the territory of other European countries. However, Russia will most likely decide to do it, using as a pretext the completion of the construction of the U.S. missile-defence system in Poland and indicating that the system's Mk-41 launchers can be used to launch Tomahawk cruise missiles. If the Kalibr missiles are deployed in Kaliningrad oblast and occupied Crimea,

almost all of Europe will be within their range. Thus, Russia will gain an advantage over European NATO countries that do not have missiles of this type or even missile defences at all. Considering the costs of both the offensive and defensive systems, this advantage will last for at least several years.

Hypersonic Weapons. Research into hypersonic weapons began in the USSR in the 1980s. Russia returned to the project in the first decade of the 21st century. It is developing both air-based (Kinschal) and sea-based (Cirkon) systems. Russia is also testing the Avangard vehicle, a hypersonic platform that will eventually be placed on Sarmat ICBMs and can deliver nuclear payloads. This is in response to U.S. plans for the development of missile defences and the doctrine of Conventional Prompt Global Strike, which aims to be able to target any point in the world with conventional missiles.

According to the Russian military, the hypersonic, long-range manoeuvring Avangard vehicle can reach a speed equal to Mach 27. It is assumed, however, that such a speed may prevent corrections to its trajectory, which would change its purpose and impair the accuracy of its internal guidance system.

In 2017, Russia introduced the Kinschal manoeuvring missile, which has a range of up to 2,000 km and was created based on Iskander missiles. It is carried to its launch altitude by modernised MiG-31 fighters and other aircraft and has a top speed of around Mach 7–10. Meanwhile, testing of the Zirkon missile (SS-N-33), designed for use against ships and ground targets, is still underway. The missile is to have a range of up to 400 km and speed of Mach 8.

Russia has also announced the development of medium-range hypersonic vehicles (500 km-5,500 km). For now, it is not known what missile will become their main carrier. Among the proposals are modified Yars missiles or the older Pioneer systems (SS-20).

Challenges in Space. Russia lacks a ballistic-missile early warning satellite system. In 2014, due to the disadvantages of its satellites, the Oko-1 system ceased to function. A new system, Tundra, is being developed, but it has not reached full readiness. To be able to work efficiently, it needs 10 satellites, and now there are only two, because Russia has had problems funding and producing the Soyuz rockets used to carry the satellites to orbit. This is because of the rockets' high failure rate and the lack of possibilities to substitute electronic components. Until 2014, when international sanctions connected with the annexation of Crimea were imposed on Russia, 70% of such components came from Europe and the U.S. Moreover, there is a shortage of experienced engineering staff, and the results of changes implemented in recent years, such as the reform of education for the needs of the army, will be visible at the earliest in a few years. In addition, it is necessary to expand the network of satellite ground-control stations, which increases the cost of operating space systems.

Conclusions and Perspectives. Russia has decided to develop systems with offensive capabilities due to the costs (cheaper than defensive ones) and problems related to the lack of acquiring technology. In the near future, the country will focus on missile systems, especially hypersonic variants, hoping to balance the American capabilities, albeit with a significantly smaller military budget. Russia's advantage is its ability to independently produce weapons such as the Yars, Sarmat, or Kalibr systems. The Russian authorities know that the development of its own hypersonic systems is a serious challenge for NATO and U.S. missile defence. Their potential use significantly shortens the time for a response and increases the threat of unintentional entry into conflict, for example, caused by a "false alarm" stemming from incorrect assessment of satellite photos from early detection systems.

At the same time, especially in the production of satellites, Russia is limited by international sanctions. Some armaments companies (including Almaz Antey, specializing in rocket weapons, or Obyedinyonnaya Aviastroitelnaya Korporatsiya, which includes enterprises producing military aircraft) have been put on the "black" list, cutting them off from western loans and investment and cooperation with EU and U.S. companies, which have stopped supplying them with technology and spare parts.

Russia does not have sufficient funds to compete with the U.S. (i.e., after the possible termination of the New START Treaty). It is also afraid of repeating the scenario from the 1980s when an expensive arms race contributed to the collapse of the USSR.

Thus, its hypersonic weapons, having unique characteristics, will be used by Russia as both an asset and a pretext to force talks on regulation at the international level. It may be willing to make concessions regarding permissible use (i.e., a prohibition on placing nuclear warheads on hypersonic vehicles), most likely in exchange for limiting the development of U.S. missile defence and a prohibition on deploying weapons in space, and a new arrangement on this issue. For this purpose, Russia may also propose limits on the possession of strategic hypersonic manoeuvring warheads, similar to the current restrictions of the New START Treaty. Regardless of possible attempts to regulate these issues, an element of NATO's response should be to strengthen its missile-defence systems and air defences, taking into account the sum of the threats from Russia.