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Military Application of Nuclear Propulsion: Russian 9M730/SSC-X-9 Cruise Missile Project

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Russia presents its Burevestnik cruise missile with nuclear propulsion as a new type of strategic weapon that should change the strategic balance with the U.S. and open new areas of arms control and arms-reduction negotiations. However, a series of failed tests has resulted in the perception of the missile as an element of Russian propaganda. Nevertheless, the continued development of this missile might prompt stronger NATO nuclear deterrence and missile defence against all types of Russian cruise missiles.

What We Know. In March 2018, Russian President Vladimir Putin presented six new models of weapons in response to advancements in U.S. missile defence systems. According to Putin, these models disrupt strategic stability between Russia and the U.S. He focused especially on the projects named 2M39 Poseidon, a drone-torpedo with a 10,000 km range, and 9M730 Burevestnik, a cruise missile described as having “unlimited range”. Both weapons are based on nuclear propulsion (small reactors that supply non-stop power) and both could deliver nuclear warheads. Putin’s presentation was illustrated with a few images of the 9M730 being launched as well as a computer visualisation of its flight path. In 2018, Russian media often featured the 9M730 project, but always illustrated their reports with virtual visualisations. In July 2018, the Russian Ministry of Defence made an announcement from an assembly building belonging to defence contractor Novator where at least four 9M730 missiles were visible, or at least mock-ups of them. The presentation was aimed at weakening the effects of Western media reports about the crash of a prototype missile and the subsequent Russian search mission in the Barents Sea. In February 2019, Russia announced it had conducted a successful test flight of the missile. Also noteworthy is that, in available sources, so far there is has been no discussion about the future role of this missile in either Russia’s military doctrine or strategy.

That Russia is developing the 9M730 was confirmed by a few media leaks from U.S. intelligence, which reportedly detected it for the first time in 2016 at the Kapustin Yar range, with the missile then designated as KY-30. After further flights at this range and in Novaya Zemlya, the missile was designated by NATO as SSC-X-9 Skyfall. By January 2019, U.S. intelligence had detected altogether 13 tests of prototypes, with 11 ending in crashes just after the missile left its launcher. In all cases, the problem appeared to be with the continuation of flight in the transition from the start-engine to the initiation of the reactor as the missile’s main engine. Even the two relatively successful flights ended after just a few minutes and a short distance. According to U.S. intelligence, the majority of the missile tests were prepared at Putin’s demand and against the suggestions of engineers from Novator and the research centre responsible for the development of nuclear propulsion. These tests are seen as the cause of the increased presence of radioactive Ruthenium and Iodine in Scandinavia, possibly stemming from the 9M730’s main engine.

Problems with Nuclear Propulsion. Russian information about the miniaturisation of nuclear reactors has been questioned by some Western non-governmental experts. They point to the many difficulties with the

miniaturisation of nuclear propulsion. These opinions, though, do not seem to consider that Rosatom, the state company responsible for the development of civilian and military nuclear technologies, has received since 2010 around a 30% real increase in its budget. These funds could have allowed Russia to make significant progress in the construction of miniature nuclear reactors and propulsion systems for the Burevestnik and Poseidon systems.

It also should be noted that the Burevestnik's development faces many of the same technical and safety issues identified in projects initiated by the U.S. and USSR at the beginning of the Cold War. Then, the concept of nuclear propulsion on strategic bombers was studied, which would give aircraft the capability of long-endurance flights and near permanent combat readiness. However, after the construction of a few prototypes in both countries, it became clear that an aeroplane-based reactor presented a threat to crews and materials. Moreover, with the start of the 1960s, both powers activated relatively secure nuclear-powered submarines with ballistic missiles, which ended the need for further work on nuclear-powered aeroplanes. The U.S. refocused its efforts on the SLAM missile-drone, which could carry up to 24 thermonuclear warheads, but even with successful tests of its main engine, the project was cancelled in 1964 because of the risk of a huge radioactive dust cloud emitted by its main engine. It's also likely that similar risks associated with the potential crash of a Global Hawk reconnaissance drone with nuclear propulsion were the reason for halting research into it (2003-2012).

Problems of the New START Treaty (NST). Even if Russia is still facing technical issues with the development of the Burevestnik and Poseidon projects, they have huge political and propaganda importance. These are tied to the uncertain future of the NST, the last treaty limiting the Russian and American nuclear arsenals after Russia's violation of the Treaty on Intermediate-range Nuclear Forces and planned August 2019 withdrawal of the U.S. Signed in 2010, the NST limited the quantity of strategic nuclear warheads and means of delivery—intercontinental ballistic missiles, sea-launched ballistic missiles, and strategic bombers. The NST will expire in February 2021, though there is the possibility of an extension to 2026. Russia has declared its support for the NST extension because the quantity and quality limits are the best guarantees for parity with the U.S. With the continuation of the NST, Russia would avoid the risk of additional costs for maintaining its strategic forces at levels above what they are today.

Until recently, there has been no clear position from the Trump administration regarding the U.S. position on extending the NST. The president's suggestion that the NST and INF should expand to include China is unrealistic due to the Chinese categorical rejection of both treaties. On the other hand, an extension of the NST for another five years may allow the U.S. not only to remain on par with Russia's strategic capabilities but also to monitor and verify its nuclear arsenal. At the same time, Trump and his advisors see the expiration or termination of the NST as a chance at more flexible paths to the modernisation of U.S. nuclear forces. If the NST expires, they view the lack of quantitative and qualitative limits as a means to strengthen the credibility of U.S. deterrence toward Russia and China.

Thus, the importance of the Burevestnik missile is tied to the fact that it is not subject to the precise definitions and limits of the NST but that it is still a strategic weapon system, with its planned intercontinental range and nuclear warhead. From the point of view of the Russian government, the missile is intended as a bargaining chip during negotiations with the U.S., meant to preserve the value of maintaining the rules of the NST. A new ground-launched cruise missile could illustrate that Russia has the capabilities to develop new strategic systems not foreseen by the treaty. If the NST expires in 2021, Russia is hoping that this new missile could be treated as a negotiation tool to gain a brand new bilateral treaty or agreement. However, the lack of successful long-range tests seems to limit Russia's goals. Further tests and investments in the development of the 9M730 missile, or other innovative weapons, has become even more probable after 2021. Only with success in these efforts will there be a credible reason for the U.S. to conclude that the interests of both nuclear powers are better ensured by treaties controlling their strategic arsenals.

Conclusion. The limited information about the actual progress of development of the 9M730 Burevestnik suggests problems with the missile, even though the programme is personally supported by President Putin. Contrary to the opinions of some experts, this missile project has more than a disinformation-propaganda function and Russia's desire to miniaturise reactors should not be dismissed. A U.S. decision not to extend the NST could encourage Russia to develop new nuclear weapons technology and new strategic weapons systems. Uncertainty about the future of the NST and the direction of the nuclear triad modernisation plans of Russia and the U.S. increase the concern among American allies. They want to avoid an uncontrolled arms race between the U.S. and Russia at both the strategic and regional levels. In this context, and especially with Russia's testing of systems not covered by the NST, there is the possibility NATO members may arrive at different political positions. Nevertheless, the Burevestnik missile's development needs to be treated as a potential military threat to NATO states. It is capable of delivering nuclear warheads at long range and with a flight profile similar to other Russian cruise missiles. These factors support the argument for a parallel strengthening of nuclear deterrence and building up a multi-layered NATO missile defence—topics so far avoided or blocked by some allies.