

Game changer: Russian sub-launched cruise missiles bring strategic effect

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Russia's attack submarines have been receiving cruise missile fits that are adding a level of power projection and operational punch previously the preserve of select Western navies. Dr Lee Willett discusses how combining emerging cruise missile technology and its newest submarines have produced a capability that has generated immediate strategic effect

On 19 March 2017, a Russian Federation Navy submarine operating in the Mediterranean Sea fired Novator 3M14 Kalibr sea-launched cruise missiles (SLCMs) against targets in Syria. This was the second time that a Russian submarine had been used to fire Kalibr SLCMs into Syria. Previously, on 8 December 2015, four weapons were fired from the Project 636 Improved 'Kilo'-class diesel-electric submarine (SSK) *Rostov-na-Donu*, also operating in the Mediterranean.

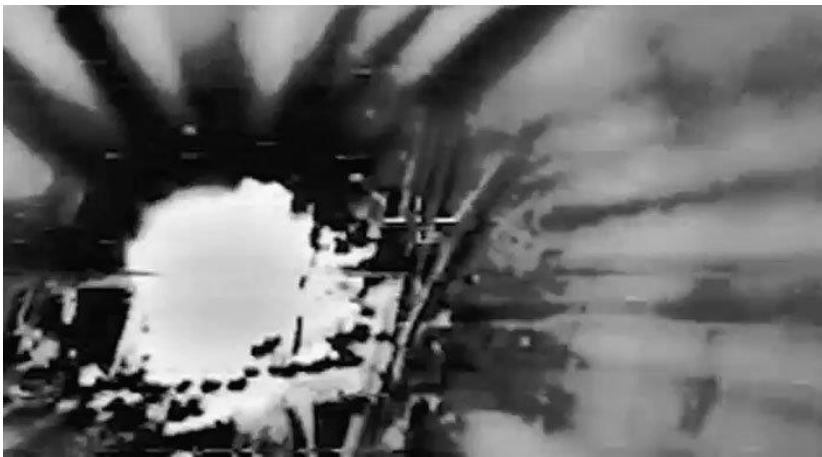


In the first operational use of Russia's submarine-launched 3M14 Kalibr cruise missile, the 636 Improved 'Kilo'-class SSK Rostov-na-Donu fired missiles from the Mediterranean Sea against targets in Syria on 8 December 2015. (Russian Ministry of Defence)

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Not only was the 2015 strike the first occasion that Russia had fired its 3M14 Kalibr variant in combat, but the boat itself had only just entered service and was en route to its home port at Novorossiysk in the Black Sea for the first time.

Moscow has possessed submarine-launched cruise missiles for some time. Perhaps most notably nuclear-capable anti-ship weapons designed to deter US Navy (USN) and other NATO naval forces from attempting to enter then-Soviet naval bastions. Using conventional cruise missiles for long-range sub-surface power projection, however, has until now been the preserve of just two navies - the USN and the UK Royal Navy (RN). Moscow has always craved the tactical flexibility and strategic leverage such a capability has afforded, so as (in tactical terms) to provide an enabling capability for military operations and (in strategic terms) to have the capacity to send for the 'cruise missile shooter' in the event of a crisis.



*Aerial reconnaissance footage of a Russian air strike in Syria, believed to be using a 3M14 Kalibr.
(Russian Ministry of Defence)*

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Moscow's history of developing a land-attack SLCM capability is a long one. The 3M14 has a deep lineage, initially thought to be based on either the 3M54-1 two-stage or 3M54 (SS-N-27A 'Sizzler') three-stage anti-ship cruise missile (ASCM), but ultimately on the nuclear-armed 3M10/KS-122 land-attack cruise missile that provided the basis of the submarine-deployed 3K10/S-10 Granat (SS-N-21 'Sampson') and mobile 3K12/RK-55 Rel'ef (SSC-X-4 'Slingshot') systems. The 'Sampson' system was seen as Moscow's initial blueprint for building a USN Tomahawk-style land-attack missile.

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Improved Kalibr

A December 2015 US Office of Naval Intelligence (ONI) report, 'The Russian Navy: a Historic Transition', noted that Russian cruise missile designs "are focused on increasing missile speed, range, and employment flexibility in addition to improving the ability to penetrate ship defensive systems".

According to the ONI report, "Kalibr provides even modest platforms ... with significant offensive capability and, with the use of the land attack missile, all platforms have a significant ability to hold distant fixed ground targets at risk using conventional warheads. The proliferation of this capability within the new Russian Navy is profoundly changing its ability to deter, [or to] threaten or destroy adversary targets."

The report added that, reflecting the navy's missions to deter, defend, and demonstrate (in peacetime) and to protect and interdict (in wartime), Kalibr will improve the navy's ability to defend Russia's maritime approaches (through the anti-ship variant) and to project power and forward defence further afield. In the latter instance, both land-attack and anti-ship capabilities would add impact with, according to the ONI, the ASCM variant employed "with the intention of eliminating or blunting the effects of ... long range land-attack cruise missiles by attacking their launching platforms [surface ships, submarines, and aircraft]".

While the operational impact of the 3M14 land-attack variant is becoming clearer, the weapon's technological specifications are still subject to some discussion. Launched from standard 533 mm torpedo tubes, it is powered by a turbojet engine and uses a combination of the GLONASS global

navigation satellite system, terrain profiling, inertial navigation, and an ARGS-14 active radar seeker to deliver its blast/fragmentation high-explosive warhead on target.

The missile is reported to fly as low as 65 ft over the sea, and 164-492 ft over land.

Some discrepancy in details is found in the warhead size and the missile's range. A number of reports note the warhead weight as 400 kg, whereas briefing materials released by the Russian Ministry of Defence (MoD) following the 2015 strikes claimed a weight of more than 500 kg.

The USN's Tomahawk has a range no other cruise missile yet can match. Manufacturer Raytheon lists its reach as "more than 1,000 miles"; however, it is understood that the Block IV Tactical Tomahawk (TacTom) could achieve a straight-line, tanks-dry range out to approaching 1,500 miles. Kalibr does appear to have improved range, likely enabled by a larger fuel load. Moreover, the range achieved in the Syria strikes has surprised many watching in the Western world. However, there is no confirmation of its range. According to *Jane's Missiles and Rockets*, the US Department of Defense (DoD) is understood to estimate the range as being in the region of 1,400 km (756 n miles), based on the missile's design characteristics. Following the first operational firing of the 3M-14T surface-launched variant in October 2015, defence minister Sergei Shoigu put the range at "almost 1,500 km". After the first submarine strike, Russian MoD statements suggested a 2,000 km range. The ONI report synthesised a number of Russian statements projecting ranges in the 1,500-2,500 km bracket. With range difficult to verify, superpower politics may see declarations on core capabilities such as range boosted for strategic effect.

In terms of Kalibr's precision, in briefings following the initial Syria strikes a Russian MoD spokesperson said that the missile is accurate to "a few metres".

A number of the navy's submarine fits are including the 3M54 ASCM variant. At a time of growing levels of naval activity in Europe, and with NATO surface ships increasingly present in northern European waters, an ASCM capability can have a similar operational and political impact as a land-attack system, in this instance by deterring NATO naval activity around waters of key strategic interest to Russia.

The 3M54 is a 'two-in-one' missile. According to *Jane's Naval Weapons*, the turbofan-powered, GNIIP AB-40 inertial navigation system-guided main missile carries a semi-encapsulated, underslung, smaller-diameter short-range supersonic sprint missile. Commonly referred to as the combat stage or section, the sprint missile separates from its 'host' in the terminal phase to attack the target. The sprint missile is understood to use the ARG-54 coherent active radar seeker, which is thought to have a maximum detection range of approximately 65 km against a ship-sized target (although this is restricted to 20 km to reduce warning time). The blast/fragmentation warhead weighs 200 kg, and probably has a semi-armour piercing design. The ASCM's range is understood to be 660 km.

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Submarine strength

It is not just the missile that is having a political effect. For some years, perhaps anticipating Russian underwater capability breakthroughs, Western naval officers have been alluding regularly to Russia's ability to take a step up in submarine technologies and operational outputs.

According to Russian strategy, submarines are central to restoring Russia's great power status. Certainly, Russian submarine operations in Europe in the last few years have been at the heart of the navy's wider return to the world stage.

With Russian submarine numbers dropping, as obsolescence and maintenance challenges, budget constraints, and shipyard capacities affect delivery rates for new boats, a cruise missile capability is enabling the navy to add more punch even with fewer platforms.

Speaking at the TDN UK 'Underwater Defence and Security' conference in Portsmouth, United Kingdom, in March 2017, Rear Admiral Kyle Cozad, commander of the USN's maritime air patrol and reconnaissance group, said that although Russian submarine force levels are lower than in the Soviet era, the numbers do not reflect "a greater capability" that exists "in terms of technology, in terms of operator proficiency, and in terms of submarine quieting", when compared to Soviet times. Driven by financial necessity rather than strategic opportunity, nonetheless there is clearly a shift from quantity to quality in Russia's underwater order of battle (orbat).

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Sub-surface orbat

Russia has been re-investing in its submarine platforms and capabilities, as demonstrated by several key overhaul and new-build programmes.



Russia's lead Project 885 nuclear-powered attack submarine Severodvinsk, pictured here during trials. The addition of Kalibr SLCM fit has seen the class given an SSGN typology. (Press Association Images)

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In terms of new boats, the long-awaited Severodvinsk-class is entering service. The ONI report refers to the submarine as "a 4th generation" multipurpose boat; it notes a class of up to eight

hulls, with build running through 2020. Boat two, *Kazan*, was launched on 31 March; according to *Jane's Fighting Ships*, two more are due to enter the water in 2018. *Kazan* is the first 885M (or 'Modernised') boat, with its design understood to be substantially different compared to that of lead boat *Severodvinsk* (on which construction got under way in 1993). According to media reports, *Kazan* is expected to be handed over to the navy in 2018.

The boats carry land-attack and anti-ship Kalibrs, with 32 SLCMs carried in total. Launch options include eight large vertical-launch tubes in the aft casing, and it is understood that each tube can accommodate four missiles. The size of the cruise missile fit has seen the class sometimes given the 'SSGN' typology (guided-missile SSN).

Lead boat *Severodvinsk*'s most recent Kalibr test firing took place in April 2016. According to an MoD statement reported by Russian news agencies, the missile was fired from the Barents Sea and struck a target ashore in the Arkhangelsk region of the Arctic.

The *Severodvinsk* class is also a host platform for a number of key developments in the second technology area in which Russian submarines are building increasing capacity to threaten Western ships and submarines - the augmentation of the navy's torpedo capability. The boats can carry up to 30 weapons and reports suggest that this loadout will include Russia's VA-111 Shkval high-speed torpedo, as well as the new Fisik and Futlyar weapons.

Another SSGN in the navy's sub-surface fleet is the Oscar II. A modernisation programme is under way for the eight boats in the class, with work reportedly aiming to add capabilities broadly similar to those of the *Severodvinsk* boats. As reported previously by *Jane's*, the upgrade programme is scheduled to be completed by 2020, with the boats to be designated Project 949AM hulls.

A key element of the upgrade is the installation of Kalibr to replace the 24 Chelomey 3M45 Granit (SS-N-19 'Shipwreck') ASCMs. A mix of land-attack and anti-ship variants will be fitted, and reports suggest that up to 72 Kalibrs could be embarked. Providing such capacity for eight boats could be an effort to move towards the punch provided by the USN's four Ohio-class SSGNs, which can embark up to 154 Tomahawks each.

During a shipyard visit on 7 March, deputy defence minister Yuri Borisov said that "the deep modernisation" work would include "the update of navigation, life support, and other systems", alongside the Kalibr fit.

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Operational impact and response

Russia's upsurge in use of its underwater capabilities to generate a greater ASW threat at sea and to strike targets ashore in combat operations has already prompted a reaction from Western powers. For example, NATO's focus on ASW exercises, including in northern European waters, is ramping up.

However, speaking at the TDN conference, Lieutenant Commander Ian Varley, deputy commander of the RN's Merlin helicopter force, said that ASCM capability developments are threatening to change the construct of ASW, forcing it away from "traditional ... close-in, cloak-and-dagger fighting" to a scenario where the adversary's submarine "sits 200 miles away and launches a missile at you... . That becomes an air war," he added. "We need to stop it becoming

an air war. We need to be able to have the ability to defend against that We need to turn that challenge into an ASW battle so that we can combat it, face it at that stage."

The submarine/Kalibr package has also seen the beginnings of a potential shift in how Western planners are taking forward concepts for integrated air and missile defence (IAMD). Speaking at the IQPC 'Integrated Air and Missile Defence' conference in London in March, Peter Woodmansee, IAMD chief at US European Command (EUCOM), said that consideration was now being given to developing the European Phased Adaptive Approach (EPAA) - conceived originally to address ballistic missile threats from the Middle East - to address Russian missile developments, particularly its new cruise missile capability.



Russia's UGST heavyweight torpedo, showing the seeker head and transducer elements. (Richard Scott/NAVYPIX)

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