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Putin's Weak Link to Crimea: Kyiv Should Target the Kerch Bridge— but Needs Missiles to Take It Out

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When Russia annexed Crimea in February 2014, the peninsula became crucial to Moscow's strategy to dominate Ukraine and the Black Sea region. Critical to that domination is the bridge spanning the Kerch Strait, the narrow strip of water that separates Crimea from mainland Russia. Built by Moscow at enormous cost, this bridge opened in 2018 to great fanfare. Since then, it has been a major conduit for the transportation of Russian soldiers and arms required for the war in Ukraine.

The bridge is currently under Russian control and is of fundamental importance to the Russian war effort. It may, however, prove to be the key to Ukraine's victory—not just in Crimea but in the wider conflict. No single event could more quickly turn the tide of the war, reset the narrative, and restore confidence in Kyiv's ability to win than crippling the most potent symbol of Russia's occupation of Ukraine.

But destroying the bridge will be a difficult task. It has been expertly constructed to bear heavy traffic. Its size, strength, and durability are such that it has withstood repeated Ukrainian attacks. For Kyiv to succeed in permanently disabling or destroying the bridge, Ukraine's Western allies must provide far larger numbers of powerful precision-guided missiles. This will be a matter of both quantity and quality: a debilitating attack will necessitate a massive salvo of missiles to overwhelm Russia's formidable missile defenses in Crimea and strike multiple vulnerabilities on the bridge simultaneously or one critical element repeatedly. Either strategy requires greater numbers of sophisticated missiles, including U.S.-made Army Tactical Missile System (ATACMS) missiles and German Taurus missiles. Until Ukraine's allies provide these or similar bunker-busting precision weapons—and lots of them—the bridge is likely to continue serving the Russian war effort.

MOSCOW'S VITAL LINK

Crimea has occupied a central place in Russian grand strategy for centuries, serving as the base from which Moscow projected its influence throughout the Black Sea region, the Mediterranean, and beyond. In 1954, Crimea was “gifted” to the Ukrainian Soviet

Socialist Republic by Soviet Premier Nikita Khrushchev, a transfer that made little practical difference as long as Ukraine and Russia were both part of the Soviet Union. But when the Soviet Union disintegrated in 1991, Crimea went with Ukraine, a fact begrudgingly accepted by Moscow. In 1997, Russia and Ukraine signed a treaty in which Moscow pledged to respect Ukrainian sovereignty over the peninsula in return for securing a long-term lease to the Russian Black Sea Fleet headquarters in Sevastopol. This lease made the Russian base a powerful bargaining chip for Kyiv and a key vulnerability for Moscow's access to the strategically significant Black Sea region. In 2014, Russian President Vladimir Putin annexed Crimea, and one of his first acts was to order the construction of a vehicle and rail bridge connecting the peninsula to Russia. Building commenced in February 2016 and was completed just two years later. It cost \$4.5 billion.

Since its opening, the bridge has become a political symbol of Moscow's integration of Crimea into the Russian state—and a potent representation of the Kremlin's neoimperial aspirations. It is partly a vanity project for Putin, feeding his self-image as a modern-day Tsar Peter the Great, reclaiming Russia's historical patrimony. It is also a physical manifestation of Moscow's narrative that unbreakable fraternal bonds exist between Russia and Ukraine, an idea Putin has used to legitimize his invasion.

The bridge's construction, however, was motivated by more than just symbolism. Russia is estimated to have spent \$20 billion annexing and integrating Crimea into its territory, and the bridge's completion created opportunities for Moscow to recoup those losses. It did so, in part, by enabling the revival of Crimea's lucrative tourism industry by facilitating easy access for Russians. The bridge also ended the peninsula's economic and logistical dependence on Ukraine. Before the bridge was built, Kyiv controlled the overland road and rail transportation routes by which most goods, services, utilities, and people moved in and out of Crimea. The bridge's opening thus addressed a major vulnerability.

But above all, the bridge was constructed for military purposes. In the buildup to the February 2022 invasion, the bridge was the only way that Russia could efficiently supply its Crimean logistics hubs and military bases with weapons, ammunition, equipment, personnel, and medicines. Today, Russia's occupation of the southern Ukrainian regions of Kherson and Zaporizhzhia is largely sustained by military forces and supplies transported across the bridge. The loss or effective disruption of this supply route would make it challenging to sustain Russian military operations in Ukraine, especially given the enormous quantities of artillery ammunition required to hold back Ukrainian forces. If Kyiv succeeded in disabling the Crimean bridge, it would dramatically increase the likelihood of a total collapse of Russian defenses in southern Ukraine.

EASIER SAID THAN DONE

It is no surprise, therefore, that the Ukrainian military has repeatedly attacked the bridge. But these attacks have been unsuccessful because of the structure's design. The bridge consists of twin spans, one carrying a double rail line and the other holding four lanes for cars and trucks, both built in three segments of roughly four miles each. The eastern and western segments of the bridge traverse open water, whereas the central segment is built on a low island in the middle of the strait. The bridge has about 7,000 pilings, vertical steel and concrete columns that penetrate deep beneath the seabed. These pilings support almost 600 massive concrete piers that rise out of the water and bear the weight of the bridge deck and support beams.

In fact, the bridge is neither innovative nor technically complex in design. But its size and strength make it uniquely hard to disable. The eastern and central segments consist of a causeway-type construction that is low and runs close to the water and land. This low-slung construction makes these segments vulnerable to attacks mounted from the sea below. The individual spans along the causeway (the areas between the supporting piers) are just under 200 feet in length. They are the easiest elements of the bridge to damage but also the easiest to repair.

The western segment of the bridge features a single long-span arched section, providing a higher and wider opening for ships to pass underneath. This segment's supporting piers are protected at the water line from ice and ship collisions by fenders and filled caissons: steel, concrete, and soil structures that prevent direct contact with the piers, providing critical standoff between the bridge and seaborne objects at the water line. These fenders and caissons also defend the massive piers from seaborne attack by presenting a navigational challenge for sea drones attempting to reach them.

Although Ukraine has already twice damaged the bridge, its attacks to date reveal how challenging it will be to disable the bridge permanently. The first attack, on October 8, 2022, was executed with a truck bomb. It exploded on the western section of the bridge, near the middle of a span, causing the deck and support beams to fail and collapse into the water along with two adjacent spans. The blast ignited several nearby rail tankers carrying fuel, resulting in a massive fire that did substantial structural damage to the rail bridge. Limited one-way vehicular traffic was restored within days of the attack, but road and rail services operated at reduced capacity for seven months. Although it disrupted Russia's ability to supply its forces in southern Ukraine, the attack did not fatally weaken the bridge support piers, instead doing damage to the deck and support beams that, although severe, was repairable.

Ukraine attacked again on July 17, 2023, using an explosive-laden sea drone that struck the underside of the eastern causeway. This section of the bridge is close to the water's surface, making it a tempting target. But the physics of an unconfined air blast that disperses its energy in all directions meant that only a small percentage of the blast's force was focused directly on the bridge's underside. Although the blast did serious damage to a section of the deck and support beams, restricted rail and road traffic resumed within days, demonstrating the limited effectiveness of open-air blasts when attacking heavy structural elements.

Both attacks illustrate critical limitations to Ukraine's ability to bring down the bridge or permanently disable it. The bridge deck is relatively thin: perhaps 12 inches of reinforced concrete topped by a few inches of asphalt. Because there is a lot of it, it is relatively easy to hit and damage—and Ukraine has. Similarly, the beams supporting the deck are comparatively light and can be separated from the piers in an explosion. The trouble is that damage to the deck and beams is relatively easy to repair, even if it is significant.

HOW TO DO IT

To disable a span permanently requires either inflicting debilitating damage to multiple piers along the bridge's causeway or destroying one of the main piers supporting the long-span arch in its western section. The pilings and piers, however, have been well designed to carry the bridge's heavy vehicular and rail traffic. The elements that must be destroyed to disable the bridge are also the hardest to damage. A massive, concentrated explosive force will be needed to cause the bridge's catastrophic failure.

Destroying a pier is likely beyond the capability of an unconfined sea drone explosion. Nor is a single limited missile attack from the air likely to succeed. The piers and the weak points that connect them to the bridge deck are small targets that are difficult to hit, even when using precision long-range missiles. U.S. ATACMS missiles are among the most sophisticated weapons in Ukraine's arsenal today, but even they, on average, land within 30 feet of their target only 50 percent of the time. This makes them precision weapons by battlefield standards, especially compared with older, less accurate missile systems that lack GPS guidance. But they cannot guarantee the pinpoint accuracy necessary to strike a relatively small target such as the concrete cap that connects the top of a bridge pier to the steel beams supporting the deck on which cars and trains travel. Furthermore, the ATACMS variant recently supplied by Washington to Kyiv carries up to 950 bomblets and is effective against airfields, troop formations, air defenses, missile launch sites, and other military targets where smaller explosions from dispersed cluster munitions can inflict serious damage. These missiles, however, cannot do concentrated catastrophic damage to hardened infrastructure. Even if Ukraine were

given ATACMS missiles with unitary warheads weighing 500 pounds, it would still likely take multiple precise strikes to fatally damage the bridge.

European missiles also have problems. Previous attacks on smaller bridges in Crimea show that a British Storm Shadow missile can put a big hole in a bridge's roadway, but it would take a large salvo of multiple missiles repeatedly hitting weak points on the piers to do permanent damage. Western and Ukrainian officials have not said publicly how many cruise missiles have been transferred to Ukraine this year. Reports, however, suggest that Washington supplied only about 20 ATACMS missiles to Kyiv in the first tranche in October 2023, some of which have already been used in attacks on Russian military targets. Ukraine, therefore, likely does not have enough missiles to carry out the kind of massive, concentrated attack that would be needed to destroy a pier.

Germany's Taurus cruise missile, designed with a two-stage bunker-busting warhead, may have the greatest chance of fatally damaging one or more bridge piers. The first-stage explosion might weaken outer layers of a pier, foundation, or joint, allowing the second-stage warhead to penetrate deeper and maximize destructiveness. But much to Kyiv's frustration, Berlin has refused to send the Taurus for fear of Russian counterescalation. These fears are overblown: contrary to expectations at the start of the war, Putin has time and again refrained from escalating beyond conventional attacks on Ukrainian targets. Nor has he launched counterattacks against any of the NATO countries supporting Ukraine. The Ukrainian government and people know full well that Putin would seek revenge if his bridge were destroyed, but they are the ones who would bear the cost of his vengeance. If that is a price they are willing to pay to free Crimea from Russian occupation, they should be given the means to do so.

The most reliable way to completely destroy the bridge would be an engineered demolition using explosive charges placed directly on the bridge at critical points, as is done in controlled civil demolitions. But this requires unimpeded access to the bridge, which Ukrainian forces do not have. There can, however, be little doubt that destroying the bridge will be one of the first things Ukrainian engineers will do if they liberate the Crimean Peninsula, ensuring that it can never be used to support Russian aggression again.

GIVE THEM THE TOOLS

Until then, Ukraine must continue to target the bridge with all means available—even if only to temporarily disable it—to disrupt road and rail traffic. ATACMS missiles with unitary warheads could allow Ukraine to regularly strike the more vulnerable spans of the bridge, compelling security and repair crews to be present and vigilant and adding to

Russia's logistical burden. Although they would not permanently sever this crucial supply line, such attacks would dilute the strategic advantage Russia's war machine derives from its occupation of the peninsula. The more missiles Ukraine is given to disrupt the Russian lifeline over the Kerch Strait, the faster it can degrade Russian defenses and set the conditions for future offensive gains.

It is evident that Russia is worried about this risk. Recent reports in *The Washington Post* reveal that Moscow has been in secret talks with China to explore the feasibility of digging a tunnel under the Kerch Strait. Such a project would be expensive, technically difficult, and dangerous because of the seismic activity in the region. It would also take years to complete, should Moscow and Beijing attempt such folly. But in the meantime, the United States can—and should—do more to supply Ukraine with the weapons necessary to severely undermine Russian military operations in Crimea.

Just as important, Washington should intensify its diplomatic efforts to convince the German government to provide Ukraine with Taurus missiles. Although the Biden administration's request for more aid to Ukraine may be stalled by budgetary gridlock in the U.S. Congress, there is no reason why the president and his administration should not pull every lever of influence to coax Germany and other NATO allies to step up their support of Ukraine at this critical moment.

Many Western leaders proclaim that they will support Ukraine's war effort for as long as it takes. This is a flawed conception of victory. Instead, they must do whatever it takes to help Ukraine defeat Russia as quickly as possible. Disabling the Crimean bridge, although a tall order, is within reach if Kyiv is given the right tools for the job.

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