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PRESENT AT THE DESTRUCTION

FOR ALMOST half a century, the world's most powerful nuclear states have been locked in a military stalemate known as mutual assured destruction (MAD). By the early 1960s, the nuclear arsenals of the United States and the Soviet Union had grown so large and sophisticated that neither country could entirely destroy the other's retaliatory force by launching first, even with a surprise attack. Starting a nuclear war was therefore tantamount to committing suicide.

During the Cold War, many scholars and policy analysts believed that MAD made the world relatively stable and peaceful because it induced great caution in international politics, discouraged the use of nuclear threats to resolve disputes, and generally restrained the superpowers' behavior. (Revealingly, the last intense nuclear standoff, the 1962 Cuban missile crisis, occurred at the dawn of the era of MAD.) Because of the nuclear stalemate, the optimists argued, the era of intentional great-power wars had ended. Critics of MAD, however, argued that it prevented not great-power war but the rolling back of the power and influence of a dangerously expansionist and totalitarian Soviet Union. From that perspective, MAD prolonged the life of an evil empire.

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The Rise of U.S. Nuclear Primacy

This debate may now seem like ancient history, but it is actually more relevant than ever—because the age of MAD is nearing an end. Today, for the first time in almost 50 years, the United States stands on the verge of attaining nuclear primacy. It will probably soon be possible for the United States to destroy the long-range nuclear arsenals of Russia or China with a first strike. This dramatic shift in the nuclear balance of power stems from a series of improvements in the United States' nuclear systems, the precipitous decline of Russia's arsenal, and the glacial pace of modernization of China's nuclear forces. Unless Washington's policies change or Moscow and Beijing take steps to increase the size and readiness of their forces, Russia and China—and the rest of the world—will live in the shadow of U.S. nuclear primacy for many years to come.

One's views on the implications of this change will depend on one's theoretical perspective. Hawks, who believe that the United States is a benevolent force in the world, will welcome the new nuclear era because they trust that U.S. dominance in both conventional and nuclear weapons will help deter aggression by other countries. For example, as U.S. nuclear primacy grows, China's leaders may act more cautiously on issues such as Taiwan, realizing that their vulnerable nuclear forces will not deter U.S. intervention—and that Chinese nuclear threats could invite a U.S. strike on Beijing's arsenal. But doves, who oppose using nuclear threats to coerce other states and fear an emboldened and unconstrained United States, will worry. Nuclear primacy might lure Washington into more aggressive behavior, they argue, especially when combined with U.S. dominance in so many other dimensions of national power. Finally, a third group—owls, who worry about the possibility of inadvertent conflict—will fret that U.S. nuclear primacy could prompt other nuclear powers to adopt strategic postures, such as by giving control of nuclear weapons to lower-level commanders, that would make an unauthorized nuclear strike more likely—thereby creating what strategic theorists call “crisis instability.”

ARSENAL OF A DEMOCRACY

FOR 50 YEARS, the Pentagon's war planners have structured the U.S. nuclear arsenal according to the goal of deterring a nuclear attack on the United States and, if necessary, winning a nuclear war by launching

a preemptive strike that would destroy an enemy's nuclear forces. For these purposes, the United States relies on a nuclear triad comprising strategic bombers, intercontinental ballistic missiles (ICBMs), and ballistic-missile-launching submarines (known as SSBNs). The triad reduces the odds that an enemy could destroy all U.S. nuclear forces in a single strike, even in a surprise attack, ensuring that the United States would be able to launch a devastating response. Such retaliation would only have to be able to destroy a large enough portion of the attacker's cities and industry to deter an attack in the first place. The same nuclear triad, however, could be used in an offensive attack against an adversary's nuclear forces. Stealth bombers might slip past enemy radar, submarines could fire their missiles from near the enemy's shore and so give the enemy's leaders almost no time to respond, and highly accurate land-based missiles could destroy even hardened silos that have been reinforced against attack and other targets that require a direct hit. The ability to destroy all of an adversary's nuclear forces, eliminating the possibility of a retaliatory strike, is known as a first-strike capability, or nuclear primacy.

The United States derived immense strategic benefits from its nuclear primacy during the early years of the Cold War, in terms of both crisis-bargaining advantages vis-à-vis the Soviet Union (for example, in the case of Berlin in the late 1950s and early 1960s) and planning for war against the Red Army in Europe. If the Soviets had invaded Western Europe in the 1950s, the United States intended to win World War III by immediately launching a massive nuclear strike on the Soviet Union, its Eastern European clients, and its Chinese ally. These plans were not the concoctions of midlevel Pentagon bureaucrats; they were approved by the highest level of the U.S. government.

U.S. nuclear primacy waned in the early 1960s, as the Soviets developed the capability to carry out a retaliatory second strike. With this development came the onset of MAD. Washington abandoned its strategy of a preemptive nuclear strike, but for the remainder of the Cold War, it struggled to escape MAD and reestablish its nuclear dominance. It expanded its nuclear arsenal, continuously improved the accuracy and the lethality of its weapons aimed at Soviet nuclear

arms, targeted Soviet command-and-control systems, invested in missile-defense shields, sent attack submarines to trail Soviet SSBNS, and built increasingly accurate multiwarhead land- and submarine-launched ballistic missiles as well as stealth bombers and stealthy nuclear-armed cruise missiles. Equally unhappy with MAD, the Soviet Union also built a massive arsenal in the hope of gaining nuclear superiority. Neither side came close to gaining a first-strike capability, but it would be a mistake to dismiss the arms race as entirely irrational: both superpowers were well aware of the benefits of nuclear primacy, and neither was willing to risk falling behind.

Since the Cold War's end, the U.S. nuclear arsenal has significantly improved. The United States has replaced the ballistic missiles on its submarines with the substantially more accurate Trident II D-5 missiles, many of which carry new, larger-yield warheads. The U.S. Navy has shifted a greater proportion of its SSBNS to the Pacific so that they can patrol near the Chinese coast or in the blind spot of Russia's early warning radar network. The U.S. Air Force has finished equipping its B-52 bombers with nuclear-armed cruise missiles, which are probably invisible to Russian and Chinese air-defense radar. And the air force has also enhanced the avionics on its B-2 stealth bombers to permit them to fly at extremely low altitudes in order to avoid even the most sophisticated radar. Finally, although the air force finished dismantling its highly lethal MX missiles in 2005 to comply with arms control agreements, it is significantly improving its remaining ICBMs by installing the MX's high-yield warheads and advanced reentry vehicles on Minuteman ICBMs, and it has upgraded the Minuteman's guidance systems to match the MX's accuracy.

IMBALANCE OF TERROR

EVEN AS the United States' nuclear forces have grown stronger since the end of the Cold War, Russia's strategic nuclear arsenal has sharply deteriorated. Russia has 39 percent fewer long-range bombers, 58 percent fewer ICBMs, and 80 percent fewer SSBNS than the Soviet Union fielded during its last days. The true extent of the Russian arsenal's decay, however, is much greater than these cuts

suggest. What nuclear forces Russia retains are hardly ready for use. Russia's strategic bombers, now located at only two bases and thus vulnerable to a surprise attack, rarely conduct training exercises, and their warheads are stored off-base. Over 80 percent of Russia's silo-based ICBMs have exceeded their original service lives, and plans to replace them with new missiles have been stymied by failed tests and low rates of production. Russia's mobile ICBMs rarely patrol, and although they could fire their missiles from inside their bases if given sufficient warning of an attack, it appears unlikely that they would have the time to do so.

The third leg of Russia's nuclear triad has weakened the most. Since 2000, Russia's SSBNs have conducted approximately two patrols per year, down from 60 in 1990. (By contrast, the U.S. SSBN patrol rate today is about 40 per year.) Most of the time, all nine of Russia's ballistic missile submarines are sitting in port, where they make easy targets. Moreover, submarines require well-trained crews to be effective. Operating a ballistic missile submarine—and silently coordinating its operations with surface ships and attack submarines to evade an enemy's forces—is not simple. Without frequent patrols, the skills of Russian submariners, like the submarines themselves, are decaying. Revealingly, a 2004 test (attended by President Vladimir Putin) of several submarine-launched ballistic missiles was a total fiasco: all either failed to launch or veered off course. The fact that there were similar failures in the summer and fall of 2005 completes this unflattering picture of Russia's nuclear forces.

Compounding these problems, Russia's early warning system is a mess. Neither Soviet nor Russian satellites have ever been capable of reliably detecting missiles launched from U.S. submarines. (In a recent public statement, a top Russian general described his country's early warning satellite constellation as "hopelessly outdated.") Russian commanders instead rely on ground-based radar systems to detect incoming warheads from submarine-launched missiles. But the radar network has a gaping hole in its coverage that lies to the east of the country, toward the Pacific Ocean. If U.S. submarines were to fire missiles from areas in the Pacific, Russian leaders probably would not know of the attack until the warheads detonated. Russia's radar coverage of some areas in the North

Atlantic is also spotty, providing only a few minutes of warning before the impact of submarine-launched warheads.

Moscow could try to reduce its vulnerability by finding the money to keep its submarines and mobile missiles dispersed. But that would be only a short-term fix. Russia has already extended the service life of its aging mobile ICBMs, something that it cannot do indefinitely, and its efforts to deploy new strategic weapons continue to flounder. The Russian navy's plan to launch a new class of ballistic missile submarines has fallen far behind schedule. It is now highly likely that not a single new submarine will be operational before 2008, and it is likely that none will be deployed until later.

Even as Russia's nuclear forces deteriorate, the United States is improving its ability to track submarines and mobile missiles, further eroding Russian military leaders' confidence in Russia's nuclear deterrent. (As early as 1998, these leaders publicly expressed doubts about the ability of Russia's ballistic missile submarines to evade U.S. detection.) Moreover, Moscow has announced plans to reduce its land-based ICBM force by another 35 percent by 2010; outside experts predict that the actual cuts will slice 50 to 75 percent off the current force, possibly leaving Russia with as few as 150 ICBMs by the end of the decade, down from its 1990 level of almost 1,300 missiles. The more Russia's nuclear arsenal shrinks, the easier it will become for the United States to carry out a first strike.

To determine how much the nuclear balance has changed since the Cold War, we ran a computer model of a hypothetical U.S. attack on Russia's nuclear arsenal using the standard unclassified formulas that defense analysts have used for decades. We assigned U.S. nuclear warheads to Russian targets on the basis of two criteria: the most accurate weapons were aimed at the hardest targets, and the fastest-arriving weapons at the Russian forces that can react most quickly. Because Russia is essentially blind to a submarine attack from the Pacific and would have great difficulty detecting the approach of low-flying stealthy nuclear-armed cruise missiles, we targeted each Russian weapon system with at least one submarine-based warhead

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or cruise missile. An attack organized in this manner would give Russian leaders virtually no warning.

This simple plan is presumably less effective than Washington's actual strategy, which the U.S. government has spent decades perfecting. The real U.S. war plan may call for first targeting Russia's command and control, sabotaging Russia's radar stations, or taking other preemptive measures—all of which would make the actual U.S. force far more lethal than our model assumes.

According to our model, such a simplified surprise attack would have a good chance of destroying every Russian bomber base, submarine, and ICBM.¹ This finding is not based on best-case assumptions or an unrealistic scenario in which U.S. missiles perform perfectly and the warheads hit their targets without fail. Rather, we used standard assumptions to estimate the likely inaccuracy and unreliability of U.S. weapons systems. Moreover, our model indicates that all of Russia's strategic nuclear arsenal would still be destroyed even if U.S. weapons were 20 percent less accurate than we assumed, or if U.S. weapons were only 70 percent reliable, or if Russian ICBM silos were 50 percent "harder" (more reinforced, and hence more resistant to attack) than we expected. (Of course, the unclassified estimates we used may understate the capabilities of U.S. forces, making an attack even more likely to succeed.)

To be clear, this does not mean that a first strike by the United States would be guaranteed to work in reality; such an attack would entail many uncertainties. Nor, of course, does it mean that such a first strike is likely. But what our analysis suggests is profound: Russia's leaders can no longer count on a survivable nuclear deterrent. And unless they reverse course rapidly, Russia's vulnerability will only increase over time.

China's nuclear arsenal is even more vulnerable to a U.S. attack. A U.S. first strike could succeed whether it was launched as a surprise or in the midst of a crisis during a Chinese alert. China has a limited strategic nuclear arsenal. The People's Liberation Army currently possesses no modern SSBNs or long-range bombers. Its naval arm used

¹ We develop our argument further in "The End of MAD? The Nuclear Dimension of U.S. Primacy," *International Security* 30, no. 4 (Spring 2006).

to have two ballistic missile submarines, but one sank, and the other, which had such poor capabilities that it never left Chinese waters, is no longer operational. China's medium-range bomber force is similarly unimpressive: the bombers are obsolete and vulnerable to attack. According to unclassified U.S. government assessments, China's entire intercontinental nuclear arsenal consists of 18 stationary single-warhead ICBMs. These are not ready to launch on warning: their warheads are kept in storage and the missiles themselves are unfueled. (China's ICBMs use liquid fuel, which corrodes the missiles after 24 hours. Fueling them is estimated to take two hours.) The lack of an advanced early warning system adds to the vulnerability of the ICBMs. It appears that China would have no warning at all of a U.S. submarine-launched missile attack or a strike using hundreds of stealthy nuclear-armed cruise missiles.

Many sources claim that China is attempting to reduce the vulnerability of its ICBMs by building decoy silos. But decoys cannot provide a firm basis for deterrence. It would take close to a thousand fake silos to make a U.S. first strike on China as difficult as an attack on Russia, and no available information on China's nuclear forces suggests the existence of massive fields of decoys. And even if China built them, its commanders would always wonder whether U.S. sensors could distinguish real silos from fake ones.

Despite much talk about China's military modernization, the odds that Beijing will acquire a survivable nuclear deterrent in the next decade are slim. China's modernization efforts have focused on conventional forces, and the country's progress on nuclear modernization has accordingly been slow. Since the mid-1980s, China has been trying to develop a new missile for its future ballistic missile submarine as well as mobile ICBMs (the DF-31 and longer-range DF-31A) to replace its current ICBM force. The U.S. Defense Department predicts that China may deploy DF-31s in a few years, although the forecast should be treated skeptically: U.S. intelligence has been announcing the missile's imminent deployment for decades.

Even when they are eventually fielded, the DF-31s are unlikely to significantly reduce China's vulnerability. The missiles' limited range, estimated to be only 8,000 kilometers (4,970 miles), greatly restricts the area in which they can be hidden, reducing the difficulty of

searching for them. The DF-31s could hit the contiguous United States only if they were deployed in China's far northeastern corner, principally in Heilongjiang Province, near the Russian–North Korean border. But Heilongjiang is mountainous, and so the missiles might be deployable only along a few hundred kilometers of good road or in a small plain in the center of the province. Such restrictions increase the missiles' vulnerability and raise questions about whether they are even intended to target the U.S. homeland or whether they will be aimed at targets in Russia and Asia.

Given the history of China's slow-motion nuclear modernization, it is doubtful that a Chinese second-strike force will materialize any-time soon. The United States has a first-strike capability against China today and should be able to maintain it for a decade or more.

INTELLIGENT DESIGN?

Is THE United States intentionally pursuing nuclear primacy? Or is primacy an unintended byproduct of intra-Pentagon competition for budget share or of programs designed to counter new threats from terrorists and so-called rogue states? Motivations are always hard to pin down, but the weight of the evidence suggests that Washington is, in fact, deliberately seeking nuclear primacy. For one thing, U.S. leaders have always aspired to this goal. And the nature of the changes to the current arsenal and official rhetoric and policies support this conclusion.

The improvements to the U.S. nuclear arsenal offer evidence that the United States is actively seeking primacy. The navy, for example, is upgrading the fuse on the W-76 nuclear warhead, which sits atop most U.S. submarine-launched missiles. Currently, the warheads can be detonated only as air bursts well above ground, but the new fuse will also permit ground bursts (detonations at or very near ground level), which are ideal for attacking very hard targets such as ICBM silos. Another navy research program seeks to improve dramatically the accuracy of its submarine-launched missiles (already among the most accurate in the world). Even if these efforts fall short of their goals, any refinement in accuracy combined with the ground-burst fuses will multiply the missiles'

lethality. Such improvements only make sense if the missiles are meant to destroy a large number of hard targets. And given that B-2s are already very stealthy aircraft, it is difficult to see how the air force could justify the increased risk of crashing them into the ground by having them fly at very low altitudes in order to avoid radar detection—unless their mission is to penetrate a highly sophisticated air defense network such as Russia's or, perhaps in the future, China's.

During the Cold War, one explanation for the development of the nuclear arms race was that the rival military services' competition for budget share drove them to build ever more nuclear weapons. But the United States today is not achieving primacy by buying big-ticket platforms such as new SSBNs, bombers, or ICBMs. Current modernization programs involve incremental improvements to existing systems. The recycling of warheads and reentry vehicles from the air force's retired MX missiles (there are even reports that extra MX warheads may be put on navy submarine-launched missiles) is the sort of efficient use of resources that does not fit a theory based on parochial competition for increased funding. Rather than reflect organizational resource battles, these steps look like a coordinated set of programs to enhance the United States' nuclear first-strike capabilities.

Some may wonder whether U.S. nuclear modernization efforts are actually designed with terrorists or rogue states in mind. Given the United States' ongoing war on terror, and the continuing U.S. interest in destroying deeply buried bunkers (reflected in the Bush administration's efforts to develop new nuclear weapons to destroy underground targets), one might assume that the W-76 upgrades are designed to be used against targets such as rogue states' arsenals of weapons of mass destruction or terrorists holed up in caves. But this explanation does not add up. The United States already has more than a thousand nuclear warheads capable of attacking bunkers or caves. If the United States' nuclear modernization were really aimed at rogue states or terrorists, the country's nuclear force would not need the additional thousand ground-burst warheads it will gain from the W-76 modernization program. The current and future U.S. nuclear force, in other words, seems designed to carry out a preemptive disarming strike against Russia or China.

The intentional pursuit of nuclear primacy is, moreover, entirely consistent with the United States' declared policy of expanding its global dominance. The Bush administration's 2002 National Security Strategy explicitly states that the United States aims to establish military primacy: "Our forces will be strong enough to dissuade potential adversaries from pursuing a military build-up in hopes of surpassing, or equaling, the power of the United States." To this end, the United States is openly seeking primacy in every dimension of modern military technology, both in its conventional arsenal and in its nuclear forces.

Washington's pursuit of nuclear primacy helps explain its missile-defense strategy, for example. Critics of missile defense argue that a national missile shield, such as the prototype the United States has deployed in Alaska and California, would be easily overwhelmed by a cloud of warheads and decoys launched by Russia or China. They are right: even a multilayered system with land-, air-, sea-, and space-based elements, is highly unlikely to protect the United States from a major nuclear attack. But they are wrong to conclude that such a missile-defense system is therefore worthless—as are the supporters of missile defense who argue that, for similar reasons, such a system could be of concern only to rogue states and terrorists and not to other major nuclear powers.

What both of these camps overlook is that the sort of missile defenses that the United States might plausibly deploy would be valuable primarily in an offensive context, not a defensive one—as an adjunct to a U.S. first-strike capability, not as a standalone shield. If the United States launched a nuclear attack against Russia (or China), the targeted country would be left with a tiny surviving arsenal—if any at all. At that point, even a relatively modest or inefficient missile-defense system might well be enough to protect against any retaliatory strikes, because the devastated enemy would have so few warheads and decoys left.

During the Cold War, Washington relied on its nuclear arsenal not only to deter nuclear strikes by its enemies but also to deter the Warsaw Pact from exploiting its conventional military superiority to attack Western Europe. It was primarily this latter mission that made Washington rule out promises of "no first use" of nuclear weapons. Now that such a mission is obsolete and the United States is beginning

to regain nuclear primacy, however, Washington's continued refusal to eschew a first strike and the country's development of a limited missile-defense capability take on a new, and possibly more menacing, look. The most logical conclusions to make are that a nuclear-war-fighting capability remains a key component of the United States' military doctrine and that nuclear primacy remains a goal of the United States.

STOP WORRYING AND LOVE THE BOMB?

DURING THE Cold War, MAD rendered the debate about the wisdom of nuclear primacy little more than a theoretical exercise. Now that MAD and the awkward equilibrium it maintained are about to be upset, the argument has become deadly serious. Hawks will undoubtedly see the advent of U.S. nuclear primacy as a positive development. For them, MAD was regrettable because it left the United States vulnerable to nuclear attack. With the passing of MAD, they argue, Washington will have what strategists refer to as "escalation dominance"—the ability to win a war at any level of violence—and will thus be better positioned to check the ambitions of dangerous states such as China, North Korea, and Iran. Doves, on the other hand, are fearful of a world in which the United States feels free to threaten—and perhaps even use—force in pursuit of its foreign policy goals. In their view, nuclear weapons can produce peace and stability only when all nuclear powers are equally vulnerable. Owls worry that nuclear primacy will cause destabilizing reactions on the part of other governments regardless of the United States' intentions. They assume that Russia and China will work furiously to reduce their vulnerability by building more missiles, submarines, and bombers; putting more warheads on each weapon; keeping their nuclear forces on higher peacetime levels of alert; and adopting hair-trigger retaliatory policies. If Russia and China take these steps, owls argue, the risk of accidental, unauthorized, or even intentional nuclear war—especially during moments of crisis—may climb to levels not seen for decades.

Ultimately, the wisdom of pursuing nuclear primacy must be evaluated in the context of the United States' foreign policy goals.

The United States is now seeking to maintain its global preeminence, which the Bush administration defines as the ability to stave off the emergence of a peer competitor and prevent weaker countries from being able to challenge the United States in critical regions such as the Persian Gulf. If Washington continues to believe such preeminence is necessary for its security, then the benefits of nuclear primacy might exceed the risks. But if the United States adopts a more restrained foreign policy—for example, one premised on greater skepticism of the wisdom of forcibly exporting democracy, launching military strikes to prevent the proliferation of weapons of mass destruction, and aggressively checking rising challengers—then the benefits of nuclear primacy will be trumped by the dangers. 🌐