



## Executive Summary

**N**uclear weapons are instruments of immense military and political power. Their existence affected every aspect of the Cold War. The appropriate roles of nuclear weapons are less clear now that the Cold War is over and much of the current U.S. nuclear force posture is extrapolated from the past. In spite of the great changes in the strategic environment, the United States and Russia still maintain arsenals of over seven thousand nuclear weapons, most with explosive force equivalent to hundreds of thousands of tons of TNT, and most ready to launch within minutes. During the Cold War, the nuclear arsenals of both the United States and the Soviet Union allowed for substantial overkill and redundancy. Thus, even large quantitative reductions in intercontinental strategic weapons do not have comparable qualitative effects. Even when the United States and Russia move to the two thousand or so weapons envisioned by the SORT or Moscow Treaty, the U.S. nuclear force structure will be a scaled down version of its Cold War arsenal. In addition the United States, and probably Russia, are exploring new missions for nuclear weapons.

This study sets out to evaluate today's nuclear missions. The range of missions for nuclear weapons is being eroded from two sides.

First, changes in the strategic environment, including the end of the Cold War, the collapse of the Soviet Union, dissolution of the Warsaw Pact, the rising conventional dominance of the United States, and the growing non-state threat have reduced the number of missions that might warrant weapons of such enormous power. The stakes involved during the Cold War were for each superpower's survival; for the West, nuclear weapons helped compensate for perceived conventional weaknesses. Nuclear doctrines evolved at a time when So-

viet tank armies were poised west of Berlin. But today, America's conventional superiority stands the Cold War strategic balance on its head. Introduction of nuclear weapons into conflicts around the world will work to the disadvantage of the United States.

Second, on-going advances in U.S. non-nuclear technology allow conventional weapons to supplant nuclear weapons in those missions that remain. During the Cold War, nuclear explosives were developed for use in torpedoes, depth charges, demolition charges, air-to-air rockets and surface-to-air missiles, and for small-unit fire support. One by one, advances in modern sensor-guided munitions have made nuclear weapons obsolete for each of these missions. Perhaps the current emphasis on nuclear attack of deep and very hard targets comes about because it is the last mission, aside from destroying cities, for which nuclear weapons are not obviously displaced by conventional alternatives.

This is not to say that nuclear weapons are not potentially extremely useful for some other militaries. The Chinese military, for example, might be viewed as at the technological level of the U.S. military in the 1960s when tactical nuclear capabilities were at their peak. Indeed, the Chinese might have difficulty sinking an American aircraft carrier in the Taiwan Strait except with nuclear weapons. The relative state of the technical sophistication of the Chinese and U.S. militaries means that nuclear weapons can compensate for Chinese weaknesses and exploit U.S. vulnerabilities.

An additional consequence of the technical development in conventional weapons is the world public's new moral perspective on nuclear weapons. Long established laws of war require that a military's violence be purposeful and directed, and discriminate to the extent practical between civilians and military targets. The line of acceptable behavior depends, therefore, on the state of technology because technical advances change the boundary of what is practical. In World War II, area bombing of cities was generally judged acceptable in the West because area bombing was the best the technology of the day allowed. Yet, while sending fleets of B-17s over Berlin was acceptable then, the same raid over Baghdad in the recent war would be judged to violate the laws of war because technology today allows for vastly greater precision and discrimination. The inexorable trend toward more precise targeting pushes choices toward non-nuclear weapons.

This study examines currently proposed missions for nuclear weapons, evaluating their net contribution to our security. The missions were compiled from reports by the Administration, Congress, the military, the national laboratories, and outside analysts. It examines fifteen missions in all, but some are grouped together. The abbreviated list is below. Many past missions, such as air defense, are not included because no one is proposing them today.

The analysis distinguishes between "missions" and "goals." For example, deterrence is not a nuclear mission. The ability to survive a nuclear attack and strike back at the attacker is the nuclear mission. Deterrence is the goal of that mission.

The Administration has declared four goals for nuclear weapons: assurance, dissuasion, deterrence, and target destruction. This study evaluates nuclear weapons by how well they meet each goal for each mission. That nuclear weapons can destroy most targets proposed for them is not in question. But they must be compared to alternatives, and benefits must be weighed against costs. For most missions, recent advances in precision guidance leave little or no relative advantage for nuclear weapons. The costs of using nuclear weapons, however, are large compared to conventional weapons. Some of these costs, such as radioactive fallout, are incurred on the battlefield. Other costs, such as proliferation incentives, are incurred even if the nuclear weapons are never actually used.

This net assessment of costs and benefits finds few missions for which nuclear weapons are the weapon of choice. In other words, if we search for missions for nuclear weapons, we can always find them; but if we search for weapons to fulfill military missions, then we will only rarely light upon nuclear weapons as the best solution.

### **Missions for U.S. Nuclear Forces**

- Survive a nuclear attack on the U.S. or its allies and strike back (for retaliation/deterrence)
- Survive a chemical/biological attack on the U.S. or its allies and strike back (for retaliation/deterrence)

- Increase enemy vulnerability (to discourage proliferation)
- Damage limiting strikes in theater
- Damage limiting strikes against Russian central nuclear forces
- Strike back after regional conventional attack (for retaliation/deterrence)
- Overawe
- Provide virtual power
- Fight/terminate regional wars

The first listed mission, **striking back after a nuclear attack on the United States or its allies**, has deterrence as its primary goal. There is wide agreement that nuclear weapons are appropriate for retaliation for nuclear attack. Nuclear retaliation meets the standards for proportionality and mission importance. However, because the stakes are so much lower now that the Cold War is over, the mission can be met with a small number of weapons. The requirements for deterrence have changed dramatically since the end of the Cold War. A nation attacks another because it expects some benefit, either military, moral, political, territorial, or economic. Retaliation aims to impose costs that are greater than any gain, thereby deterring the initial attack. The Cold War was a confrontation of two hostile, incompatible ideologies, each believing it was a model for the whole world. If the world is the prize, then the retaliator must threaten crippling pain to make seizing the prize seem like a bad deal. In other words, the retaliatory threat must be tied to the stakes involved. With the end of the Cold War, the stakes involved in potential conflicts with traditional military powers are substantially smaller.

Some argue that "rogue" states are not deterrable. Whether they are deterrable or not, retaliation does not really describe the response the United States would make to a rogue state's attack. If, for example, North Korea attacked the United States with nuclear weapons, it would be defeated and occupied. The United States might or might not use nuclear weapons, but using them would not be for anything that could be called "retaliation."

A **damage limiting strike** against Russian central nuclear systems is also an

inherently nuclear mission. This mission makes sense only if the attack comes close to complete success. Conventional weapons might with repeated attacks destroy hard nuclear targets such as missile silos but the mission requires high confidence of destruction on the first strike, which demands the power of nuclear weapons. The Administration argues that it no longer specifically targets Russian nuclear forces, indeed, that the U.S. nuclear force structure is directed as much at Syria or Iran or China as at Russia. Yet none of these potential threats, even from China, requires anywhere near the number of high yield, high accuracy, high alert, long-range nuclear weapons the United States holds. In spite of current doctrine, the U.S. nuclear arsenal looks much as it would if a disarming surprise first strike against Russian forces were its paramount mission.

The Russians depend on a large initial arsenal, combined with hopes that any U.S. attack will not be 100 per cent successful, to insure that an adequate retaliatory force will survive. But this means that the United States daily faces a large Russian nuclear force that could be launched intentionally or by accident.

So the **damage limiting** mission of U.S. nuclear forces drives not just their current structure; it will shape them even after fulfilling the Moscow Treaty obligations. Even in 2012, the majority of deployed U.S. nuclear weapons will be warheads having hundreds of kilotons of yield sitting atop no-warning, quick-launch, high-accuracy, fast-flying ballistic missiles. These are precisely the sorts of weapons that would be used in a disarming first strike. If the United States were to abandon this one mission, it could, in cooperation with Russia, effect truly meaningful reductions in the world's two largest nuclear arsenals. Moreover, safer, more stable deployment and basing options would become available for Russia as well as the United States. This mission, the damage-limiting attack on Russian central nuclear systems, perpetuates the most dangerous characteristics of the Cold War nuclear confrontation.

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Two of the missions that this study calls the **virtual power** mission and the

**overawe** mission have difficult-to-specify metrics. The first is the mission of providing the United States the confidence of a nuclear backstop to allow active engagement in the world. The second is the mission of impressing upon other nations, specifically China, the futility of a nuclear competition with the United States. In both cases, the missions are defined in terms of the effect that, not just power, but nuclear power bestows so they are both intrinsically nuclear missions. The virtual power mission is a remnant of the Cold War in which the United States faced another superpower with formidable forces, both nuclear and conventional. Whatever residual benefit this mission might have must be weighed against the cost of legitimizing to the world the cachet and appeal of nuclear weapons. In any case, the mission can be met with an order of magnitude fewer weapons than in the current or planned U.S. arsenals.

Any benefit from the overawe mission depends on a combination of circumstances that this analysis judges to be improbable, but not impossible. Chinese actions suggest they see some advantage to what they judge to be an adequate nuclear arsenal, perhaps measured by the need to checkmate the coercive use of U.S. nuclear forces in a contest over Taiwan. But their behavior has never suggested that they think checkmate requires matching the United States. Yet keeping large numbers of nuclear weapons for the sake of this hypothetical, potential benefit blocks the lowering of real risks by continuing reductions, along with the Russians, in the world's two Cold War legacy arsenals.

A nuclear response has been suggested as an appropriate **retaliation against chemical or biological weapons (CBW) attack** on the United States or its allies, with the aim of deterring such attacks in the first place. The United States has voluntarily given up chemical and biological weapons, so retaliation in kind is not an option. Biological and chemical weapons are not particularly useful militarily against the sort of well protected military force that the United States would field. But they are effective terror weapons, so this is one case in which nuclear weapons might be more discriminating than response in kind. Certainly chemical attacks and probably biological attacks will be less damaging to the United States than nuclear attacks. So the shock to the country and the expected benefit to the attacker will be less. The retaliatory pain required to deter such attacks should be lower; so such attacks should be handled by the force designed to deter nuclear attack. (This **deterrence** mission is distinct from the **chemical/biological counterforce** mission discussed below.)

The Nuclear Posture Review (NPR) suggests that a U.S. capability and willingness to target enemy weapons of mass destruction (WMD) reduces their utility and can shift a nation's cost/benefit calculus to the point that it will forego development of WMD. The relevance of this mission depends on the extent to which U.S. actions affect regional powers' WMD development decisions. Some nations, for example, Pakistan and India, develop nuclear weapons for reasons largely unrelated to the United States. Other nations such as North Korea and Iran want nuclear weapons in part to deter conventional attack by the United States.

To be successful, this mission requires that the United States has dependable targeting information and that the enemy's easy countermeasures, such as making its WMD mobile or dispersed, are not available. The mission also requires that the possibility, even likelihood, of U.S. nuclear use, even preemptive use, is plausible. The necessary perception of U.S. readiness to use nuclear weapons will tend to legitimize them and to some extent counteract the effect that dissuasion seeks.

Even if these conditions are met and nuclear weapons have some dissuasion effect, they must be compared to conventional alternatives. Remember that for this mission the WMD weapons need not necessarily be rendered impotent, just useless to the proliferating nation. Thus, questions of whether nuclear heat is required to neutralize biological weapons does not necessarily come up (although it is important to the counterforce mission discussed next). Conventional weapons can have the same positive effects with less of the negative effect. So they are, on balance, better suited for this mission.

If dissuasion fails, the United States may find itself in the position of wanting to destroy WMD in a military theater during a conflict. The situation here is complex. The effects of nuclear explosives on stored biological weapons, for example, what would be destroyed and what might be dispersed, are not known for certain. Tests could be conducted with conventional explosives that could answer some but not all of these questions. It certainly is true that carefully contrived situations can be postulated that seem to require nuclear weapons. For example, nuclear weapons would be useful if the enemy digs storage tunnels just beyond the reach of conventional weapons but stops digging before he is out of reach of nuclear weapons. There is no reason to believe any enemy will be so

cooperative.

Digging underground began, in the first place, as a countermeasure to the development of precision conventional strike. Digging deeper is a simple countermeasure to any new U.S. nuclear strike capability (as is dispersion or making the targets mobile). This mission will also require extremely good intelligence or lots of weapons. Nuclear weapons can be used for this mission, but they are likely to have no dependable advantage compared to conventional alternatives in most, perhaps all situations. Yet the full cost of developing a nuclear capability must be borne, including the proliferation pressures inevitable if the United States "nuclearizes" existing conventional missions.

In general, for those missions that can be filled by either nuclear or conventional weapons, a comparison of the costs and benefits of both leaves only a narrow set of circumstances where nuclear weapons are preferred. This is not a surprise; no one suggests that nuclear weapons are the instruments of first choice. Everyone agrees that the overwhelming majority of foreseeable military missions will be met with conventional weapons. "Advocates" of nuclear weapons, who argue for greater consideration of nuclear use, are not arguing for widespread, profligate nuclear bombing. The central debate is between those who want nuclear use to be very rare, and those who want it to be very, very rare. The question is whether the United States should maintain, or even develop, nuclear weapons for those few, special cases where they seem advantageous on the chance that these extraordinary circumstances might arise. This study concludes that the United States should not.

For the missions that can be met by either nuclear or conventional weapons, whatever slight short-term tactical advantage nuclear weapons might provide are outweighed by their long-term global costs. The United States enjoys broad conventional military superiority. Over the last decades, the United States has, moreover, used that conventional superiority to execute a military strategy of forward deployment and conventional engagement that is particularly vulnerable to even primitive nuclear weapons. Anything that tends to conventionalize nuclear weapons and works toward their more likely use works against American superiority and the strategy and interests of the United States.