

SUMMARY REPORT



Weapons of Mass Destruction Conference

Avoiding a Nuclear Catastrophe

“We cannot be the UNREADY
confronting the UNTHINKABLE”



USAF Counterproliferation Center (CPC)
Defense Threat Reduction Agency (DTRA)
Air Force Research Institute (AFRI)



Avoiding a Nuclear Catastrophe

Summary Report

This report is the summary of the US Air Force Counterproliferation Center (CPC) and Defense Threat Reduction Agency (DTRA) Weapons of Mass Destruction (WMD) Conference, which was held on 18–19 August 2010. The CPC provides the Air Force with assistance in counterproliferation research and education. DTRA is the US Department of Defense’s official combat support agency for countering WMD, addressing the entire spectrum of chemical, biological, radiological, nuclear, and high-yield explosive threats. For more information, contact the CPC at (334) 953-7538 or DTRA at (703) 767-5870.

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THE WHITE HOUSE

WASHINGTON

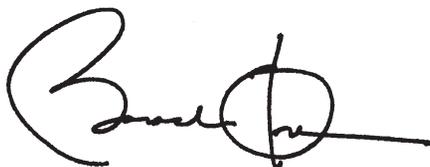
August 13, 2010

I am pleased to welcome all those attending the annual United States Air Force Counterproliferation Center and Defense Threat Reduction Agency WMD conference, "Avoiding a Nuclear Catastrophe." Your contributions to preventing the spread of nuclear weapons are vital to our Nation's security, and I thank you for your dedication and service.

We face no greater threat than the acquisition and use of nuclear weapons by additional countries or terrorist groups, and we can only defeat this danger through cooperation and collective action. These efforts must involve not only governments but civil society as well, including nongovernmental organizations, industries, international organizations, and think tanks.

My Administration is committed to ensuring that the United States lives up to our responsibilities under the Nuclear Nonproliferation Treaty, and to providing global leadership to ensure other countries live up to theirs. This is a key challenge facing the United States today, and we have worked tirelessly to advance this agenda in multiple forums by: completing the Nuclear Posture Review, negotiating the New START Treaty, convening the Nuclear Security Summit, contributing to the consensus document produced by the Nuclear Non-Proliferation Treaty Review Conference, supporting the adoption and implementation of several United Nations Security Council Resolutions targeting proliferators, and strengthening international efforts like the Global Initiative to Combat Nuclear Terrorism and the Proliferation Security Initiative. Your continued hard work is critical to the success of our future nonproliferation activities, which create a safer America and more secure world for our children.

Our charge does not end here. Your work at Maxwell Air Force Base over the next two days must continue in the future. I look forward to hearing the results of your deliberations, and I wish you all the best for a successful and productive conference.

A handwritten signature in black ink, appearing to be "Barack Obama", written in a cursive style. The signature is positioned at the bottom center of the page.

Introduction

An estimated 35 countries have nuclear weapons, highly enriched uranium, and/or stockpiles of plutonium on their soil. Although four out of every five nuclear weapons that have been built since 1945 have retired from service, the world is still awash in nuclear weapons. Nuclear weapons states now possess around 23,300 such weapons. This is occurring at a time when one such weapon detonated in a major city could have catastrophic human and economic effects.

For example, one RAND study estimates that one 10-kiloton weapon explosion in Long Beach, California, could cause 60,000 immediate deaths and up to 150,000 other casualties. Such a detonation would destroy the ports of Long Beach and Los Angeles, causing about 6 million people to evacuate the area to escape fallout, and 2–3 million people to relocate. Such a nuclear catastrophe would contaminate 500 square kilometers and destroy or make uninhabitable up to 600,000 homes. It would also inflict an economic rebuilding cost estimated at one trillion dollars. This could make the 9/11 attacks, however grisly, seem somewhat minor. Yet this would be the consequence of only one nuclear bomb at one major US port. A full-scale nuclear war between two major states, such as the United States and Russia, would have far more catastrophic effects than even a nuclear terror attack. The deaths could reach hundreds of millions in the first exchange.

President Obama's Nuclear Agenda

On 5 April 2009 in Prague, Pres. Barack Obama advocated proceeding with a combination of strength and diplomacy to help the United States and its allies and friends around the globe continue to ride the nuclear tiger safely via deterrence, paired with a long-term nuclear exit strategy. He encouraged a policy of reducing the role of nuclear weapons in our national security strategy and urged others to do the same. He additionally articulated a long-term goal of working toward a world without nuclear weapons. "Make no mistake, as long as these weapons exist, the United States will maintain a safe, secure, and effective arsenal to deter any adversary and guarantee that

defense to our Allies,” he said in the peace-through-strength part of the speech.¹

President Obama amplified those remarks in a letter to the “Avoiding a Nuclear Catastrophe” conference. “My administration is committed to ensuring that the US lives up to its responsibilities under the nuclear Nonproliferation Treaty (NPT), and to providing global leadership to ensure other countries live up to theirs,” he wrote.² He listed several steps his administration has taken to accomplish this mission.

First, the United States recently conducted the 2010 Nuclear Posture Review (NPR) that defined the role of US nuclear weapons. Second, the United States and Russia negotiated and signed the New Strategic Arms Reduction Treaty (START) in April 2010. Further, that same month the president hosted the Nuclear Security Summit in Washington, DC, to obtain worldwide agreement to lock down and secure all highly enriched uranium (an estimated 1,600 tons worldwide) and all plutonium (an estimated 500 tons worldwide) within the next four years, taking them out of the reach of potential terrorists and rogue states. Third, the president sent a delegation to the Nuclear NPT Review Conference at the United Nations headquarters in May 2010 to pressure the world community to reduce nuclear stockpiles and loose nuclear materials and to continue a worldwide nonproliferation effort. The events of this extraordinary “nuclear spring” are steps designed to prevent and retard proliferation of nuclear weapons and prevent them from falling into irresponsible hands.

Chief of Staff Vector 2010—Priority Number One

In addition to the nonproliferation steps, the United States is seeking to strengthen its nuclear retaliatory force and its nuclear weapons infrastructure. To preserve its deterrent effect, the US armed services maintain a nuclear triad of bombers, intercontinental ballistic missiles (ICBM), and a fleet of ballistic missile submarines (SSBN). The chief of staff of the Air Force (CSAF), Gen Norton A. Schwartz, sent a Chief of Staff Vector 2010 message stating, “I want to provide some direction about where we need to go as a service. The first priority is to continue to strengthen the nuclear enterprise.”

The last two years have seen some success in reinvigorating the Air Force nuclear enterprise, so the next steps are to strengthen the effort by implementing the NPR and New START, strengthening inventory control, refining the inspection process, modernizing and recapitalizing the nuclear forces, and training, developing, and motivating the men and women in the Air Force who work on nuclear matters.

General Schwartz noted the creation of the Global Strike Command, which puts all Air Force bombers and ICBMs under a single commander, Lt Gen Frank Klotz. Also created was the position of assistant chief of staff for strategic deterrence and nuclear integration, filled by Maj Gen William Chambers, who will serve as chief advocate for nuclear programs operating from Headquarters Air Force/Deterrence and Nuclear Integration Office (A10) in the Pentagon. The command has also been tasked to establish a more rigorous inspection process. A10 will be tasked to advance the scientific, research and development (R&D), and human capital efforts necessary to field robust, sustainable nuclear missile and bomber forces well into the future.

Additionally, the Air Force created the Air Force Nuclear Weapons Center, located in Albuquerque, New Mexico, to ensure that its nuclear arms are safe, secure, reliable, and sustainable. The aim is also to establish a set of positive inventory control measures to prevent future mishandling and incidents. General Schwartz tasked these organizations to prioritize and invest in the modernization and recapitalization of the nuclear forces and to craft a comprehensive deterrence and crisis stability vision that builds on the 2010 NPR.

Thinning the Nuclear Threat—Three Elements

The period since the end of the Cold War has been challenging. The focus shifted from strategic deterrence to continuous conflict in places such as Iraq and Afghanistan where the Air Force's other conventional components were most central to the mission, while the strategic forces provided top cover. Counterinsurgency and counterterrorism operations have been the Department of Defense's (DOD) and the Air Force's focus

for many years now. The Air Force returned to full focus on its nuclear, deterrence, and strategic missions only recently.

Three primary ways exist to thin out the threat of adversaries who possess or are seeking weapons of mass destruction (WMD) like nuclear weapons: initiatives in nonproliferation, counterproliferation, and consequence management.³

A first way to thin or reduce WMD proliferation to states and groups of concern is through unilateral and multilateral nonproliferation initiatives. Nonproliferation is accomplished through disarmament treaties, arms control agreements and pacts, various export control regimes, interdiction programs designed to limit illicit trafficking of WMD technology, sanctions, and incentives designed to influence states not to acquire WMDs or to relinquish them.⁴ Various other nonproliferation measures abound.⁵

A second means of reducing the threat of WMD-armed adversaries is through counterproliferation military programs that provide one or more of the following: (1) a deterrent against the initiation of war or the escalation of an ongoing conflict; (2) offensive operations or counterforce capabilities to hold at risk, destroy, or capture rival WMD assets; (3) active defenses to prevent effective delivery of WMDs on US or allied targets; and (4) passive defenses that can help protect personnel and assets and get the military back in the fight.

A third method to further reduce the WMD threat is consequence management capabilities that will help the forces survive, fight, and win after being attacked. These capabilities will care for military personnel and civilians who have been victims of WMD attacks.

No single answer exists on how to avoid a WMD disaster, but by working in tandem, all elements of the nonproliferation, counterproliferation, and consequence management elements can thin, reduce, and eliminate much of the threat. If all these elements work well, the threat might be reduced to a manageable size. A catastrophic situation could be avoided, which is the aim of the overall US and allied forces combating WMD programs.

The US lead agency for nonproliferation programs is the Department of State working with the Departments of Commerce, Energy, and Treasury. Although the DOD plays a supporting role in nonproliferation, it takes the lead in counterproliferation

programs designed to provide deterrence, active and passive defenses, and offensive operations against adversary WMD assets.

The Defense Threat Reduction Agency (DTRA) supports all three means of lessening the nuclear threat and plays a key role in supporting the combatant commands, US Strategic Command, and the White House in countering WMD threats. DTRA has several high-profile missions: the Nunn-Lugar Global Threat Reduction Initiative, arms control verification, nuclear detection and forensics work, nuclear stockpile management procedures, inspecting nuclear arms control agreements, improving counterforce technologies in the hard-target-kill programs, and supporting a multitude of other nuclear, biological, chemical, and radiological nonproliferation, counterproliferation, and consequence management programs. Other partners in combating WMD work elsewhere in the DOD and at the Departments of Energy, State, Homeland Security, and Justice, the Federal Bureau of Investigation, any one of the 16 agencies in the US intelligence community, the White House, and the National Security Council.

The Central Role of Deterrence

The goal of nonproliferation efforts is to keep potential adversaries from acquiring and using nuclear weapons. If preventing adversaries from acquiring such weapons fails, the tools of counterproliferation and consequence management become essential. Once an adversary has nuclear weapons, deterrence by threat of retaliation becomes the most potent means of preventing a nuclear conflict. An adversary must believe that the consequences of using nuclear weapons will be so costly that it is not worth the risk. With regard to nuclear threats, deterrence by the threat of retaliation is the strongest means of persuasion. In its simplest terms during the Cold War, the two superpowers were communicating to each other, “if I die, you die.”

Classic Cold War deterrence theorists posited that six elements need be present to maximize deterrent effects. First, the United States must have the capability to inflict what Soviet leaders believed to be an unacceptably costly level of damage if their government attacked. Second, the United States had to maintain a second-strike retaliatory capability that could survive

an initial attack and still inflict an unacceptable level of damage. The force needed to be ready, precise, reliable, and available for a 24-hour-a-day, seven-day-a-week, year-round (24/7/365) mission. The third requirement was that the US leadership must have the will to use such retaliatory power if put to the test in a crisis or war. Fourth, the United States and its allies would be required to effectively communicate to the rival leaders that we had the capability, survivability, and will to respond with massive force if necessary. Fifth, opponents must be rational and informed, and they must care about their own survival more than inflicting pain on the United States and its allies. Sixth, US and allied intelligence must be able to identify the source of the attack and the location of vital assets of the attacker. If these elements were in place, the adversary should have been deterred in most scenarios.

The six elements were considered the essential components of a successful deterrence posture in the US-Soviet Cold War. Possibly this mix will deter future state rivals as well. However, deterrence success may also be dependent on other factors. For example, the individual personalities of leaders in leader-dominated societies such as Saddam Hussein's Iraq or Adolph Hitler's Nazi Germany may determine the success or failure of deterrence. The regime type, the strategic culture, and the history of the dispute also come into play. Finally, deterrence effectiveness may vary with the situation or scenario.

A good set of deterrence questions includes the following: (1) How much of what kinds of capability and initiatives is enough to prevent a rival from going to war or escalating a military conflict to high, very costly levels? (2) How much is enough? (3) For what purpose? and (4) By what metrics can effects be measured? Deterrence may have several purposes, but deterring an adversary from initiating war, especially a nuclear war against your country, is most fundamental.

Deterrence is seen as an antidote to armed aggression and as a means to prevent escalation of conflicts to the nuclear level. Further, deterrence of nuclear weapons acquisition, conventional weapons use, escalation, or other very serious injuries to one's own vital interests are included in talks on deterrence. Nuclear deterrence threats may also be issued against those

who aid and abet potential enemies who would attack or have attacked the United States, its vital interests, and/or its allies.

The “how much is enough?” question pertains both to deterrence of one’s own country and to that of allies. The answer may be different in each case, depending on who and what is to be deterred.

It is common—though somewhat inaccurate—to refer to nuclear bomber, ICBM, and submarine-launched ballistic missile (SLBM) forces as “the deterrent.” Nuclear forces are the most powerful of retaliatory forces but in some cases may fail to deter escalation or war. Nor are nuclear forces the only instruments of deterrence. Nonnuclear global strike forces such as those now being added to the Air Force Global Strike Command could be influential additions to US deterrence capability, as are all the conventional forces of the Navy, Marines, Army, and Air Force. Other deterrence tools may include potential economic sanctions, cyber operations, and international criminal penalties.

But how does one measure deterrence sufficiency? At one time US defense policy makers set arbitrary sufficiency goals of being able to, in a retaliatory strike, destroy a certain percentage of Soviet defense industrial capacity, armed forces, and population. Other notions of “enoughness” included certain levels of resiliency of the forces, surge potential, “second-to-none” measures, “essential equivalence,” and flexibility and adaptability as the situation warranted. It is thought that US and allied forces need to be sufficient to achieve the goals in deterrence-conflict scenarios. Thus, the forces must “fit the task” assigned in each situation.

To conclude, deterrence may be best understood by applying a scenario-based approach. In a set of deterrence scenarios, each must elicit answers to two questions: (1) what deterrence policy should be adopted versus states and groups of concern? and (2) what deterrence capacities broadly defined (quality and quantity) would best contribute to achieving those goals in a given scenario?

Conflict could lead to military exchanges in a world of more than 190 states in many ways. Six scenarios that could lead to a nuclear exchange include the following:

- A nuclear-emboldened Iran increases its intervention in the Persian Gulf, creating a crisis with Saudi Arabia, Bahrain, the United Arab Emirates (UAE), and the United States.
- Russia steps up its pursuit of a sphere of interest in the near-abroad and intervenes in Ukraine, a North Atlantic Treaty Organization (NATO) Partner for Peace country.
- Tensions escalate in a new China-Taiwan crisis, and the US fleet is reinforced in the straits as China mobilizes for a conflict.
- Terrorists conduct a strike against a major US city, and Iran's leadership is detected as a sponsor of the group.
- The North Korean regime, faced with growing political unrest, splits in the North Korean army, and potential loss of power, begins border raids against the Republic of Korea (ROK) forces along the demilitarized zone to mobilize internal support for the regime against an external foe.
- North Korea is detected attempting to sell a nuclear weapon to al-Qaeda, precipitating an acute US-North Korea crisis.

Across each of the state-to-state scenarios, strategic offensive nuclear forces appear to be relatively less important than one might have guessed before thinking through the scenarios. US nuclear force survivability appears unimportant when confronting a nuclear Iran or North Korea, as these countries do not possess enough nuclear weapons to mount a disarming first strike. Limited numbers of US nuclear weapons are sufficient, especially if they are tailored to the task and permit flexible targeting. Until such rogue regimes acquire long-range missiles and substantial nuclear weapons, the United States does not need to rely upon an assured, devastating retaliatory power on the order of US-Soviet forces in the Cold War. Some of the rogue states may be one- or two-bomb states, which means that the states could be decapitated and their economy and government incapacitated with very few nuclear weapons and exquisite intelligence. Therefore, the current US nuclear levels are not driven by smaller nuclear powers' uncertainties about rolling back those forces via reduction negotiations.

Deployment of a conventional precision-guided ICBM to carry out the conventional global strike mission may figure

prominently in scenarios involving Taiwan or North Korea. This global strike capability is flexible, adaptable, and more “useable” than the draconian nuclear option. Use of conventional precision-guided munitions (PGM) mounted on intercontinental rockets would not destroy the taboos on use of nuclear weapons and may be more readily authorized by a US president in a regional crisis or conflict. Indeed, it may be possible in situations where adversary leadership is located by allied intelligence, surveillance, and reconnaissance (ISR) to either target them or “hold them personally accountable.”

Missile Defense and Deterrence

Another conclusion in these kinds of regional contests with adversary states is the high utility of air and missile defenses for creating deterrence effects. The capability to defend partially or wholly against small numbers of missiles held by such opponents may help them decide not to risk war. Air and missile defenses in the theater help to protect forward-based US and allied forces and assets. Strategic missile defenses at home help to preclude damage from small-scale ballistic missile attack. The existence of active defenses, in addition to a substantial offensive retaliatory capability, lead potential adversaries to perceive the United States and its allies as less inviting targets and more formidable foes. This applies to confrontations with China in the Formosa Straits, North Korea on the Korean Peninsula, or Iran in the Persian Gulf region.

Building a ballistic missile defense (BMD) has become increasingly important in the past two decades, since ballistic missiles have been used in every major international conflict during that time. Ballistic missiles are increasingly becoming the “air force of choice.” For example, each year an average of 80 to 120 foreign missile flight tests occur. China, Russia, Iran, and North Korea are among the most active testers. The proliferation of ballistic missiles continues, and if those missiles are mated with nuclear weapons, they can pose a serious threat to US and allied security.

For example, North Korea is developing and deploying eight types of ballistic missiles. The short-range Scud-Bs and Scud-Cs and the newer Toksa missiles are all capable of striking Seoul.

The medium-range Scud-ER (extended range) and No-dong and the long-range Taepodong 1 can strike Japan. The new long-range Taepodong 2, now being tested, could eventually strike Hawaii, Alaska, California, and much of the American West.

Another threat is posed by Iran's ballistic missiles—short-range Scud B and C missiles, medium-range Shahab-3 and Ashura missiles, long-range Safir space launch vehicles, and intermediate-range ballistic missiles modeled on North Korean No-dongs. Iran is projected to test its first ICBMs by 2010–15. The Defense Intelligence Agency director recently stated that “Iran continues to develop and acquire ballistic missiles that can hit Israel and central Europe.” With an ICBM capability, the United States can be added to that Iranian target list.

China is the most active country developing new ballistic missiles and tops the list of states conducting flight tests. Six new long-, medium-, and short-range missiles are emerging, including SLBMs. The CSS-5 Mod 5 is a serious threat to US carrier battle groups with its ability to precisely target moving ships at operational ranges. China has also developed an anti-satellite capability with a direct ascent ballistic missile. Thus, Chinese missile development could threaten the US capability to project power in a confrontation.

Possession of ballistic missiles by such states can be coercive without an effective US missile defense in place. As Iran, North Korea, and China increase missile capability, the United States' ability to defend its Middle Eastern, European, and northeast Asian allies is diminished unless US and allied BMDs keep pace with the growing threats. Presently the United States maintains and has in development multiple BMDs. The trajectory of a missile fired at the United States or an allied country can be divided into the boost, midcourse, and terminal phases of flight to the target. The United States is working on defenses that operate during each phase.

In the boost phase, there is little present capability. The United States recently terminated the kinetic energy interceptor and the multiple kill vehicle program. The United States will maintain an airborne laser in a very lean R&D program. In the midcourse phase, the United States already possesses Aegis standard missile-3s (SM-3) on cruisers and land launchers and deploys the ground-based midcourse defense interceptors

in Alaska and California. Should enemy missiles penetrate beyond midcourse, they will be met by patriot advanced capability-3 (PAC-3) interceptors, terminal high-altitude area defense (THAAD) interceptors or sea-based terminal interceptors. Sensors to support these systems include the defense support program satellites, the space-tracking and surveillance system, the Predator airborne sensor sea-based radars, forward-based radars with adjunct sensors, midcourse X-band radars, and other early warning radars.

The United States deploys 24+ long-range interceptors in Alaska and California, roughly 40 SM-3s on 18 Aegis ships, and another 40 SM-2s on Aegis cruisers and destroyers. It possesses 60 PAC-3 fire units and 798 PAC-3 interceptors. There are 27 THAAD fire units with about 24 interceptors; up to 200 THAADs are to be acquired.

Trying to “hit a bullet with a bullet” in space is a difficult technical feat, yet in terminal and midcourse tests, 38 of 48 hit-to-kill successes have occurred since 2001. BMD has begun to achieve a significant capability against limited numbers of missile attacks. To maintain an effective integrated BMD, the United States must continue to bolster boost-phase defenses so that intercepts can take place when the enemy missile is most vulnerable to attack and most visible to sensors and has not yet released its reentry vehicles at the target.

The United States also has a continued need to improve sensors that can cover rival missile launches through the point of intercept. Such BMD sensors must counter masking and other countermeasures to provide advanced discrimination of the location of the weapons package en route to the target. The United States and its allies also must continue the development of maneuverable interceptors that are responsive to adversary maneuvers. Work is also needed to provide multiple shots per incoming missile or reentry vehicle to improve the lethality of the defenses.

As potential adversaries acquire more and better missiles, the defense also needs increased quantities of upgraded interceptors. Further, in the terminal phase defense, multiple and mobile defenses are needed to provide short-range coverage in the final seconds of the adversary’s missile flight. Finally, the entire BMD system requires continued updating to ensure

increased levels of integration matching a variety of sensors with multiple shooters.

Integrated missile defenses are not the sole province or responsibility of the United States, although it does the bulk of the development and is the most advanced in BMD. BMD discussions and mutual projects exist between the United States and countries such as the United Kingdom, Italy, Denmark, Australia, Japan, the Czech Republic, Netherlands, France, Poland, Romania, India, UAE, Israel, the ROK, Germany, Ukraine, Bahrain, and Qatar. All of NATO is jointly sponsoring work on the active layered theater ballistic missile defense (ALTBMD) program designed to provide connectivity between US and NATO systems.

In the 2010 ballistic missile review, conducted by the US government, the United States was tasked to continue to defend the homeland against the threat of limited ballistic missile attack and regional threats to US forces protecting Allies and partners and enabling them to defend themselves. Further, before new BMD capabilities are deployed, they must undergo testing that enables assessment under operational conditions. Any commitment to new BMD capabilities must be fiscally sustainable over the long term. Such BMD deployments must be able to adapt as threats change. Finally, the United States will seek to lead international efforts for missile defense.

This BMD review suggests continuing earlier US BMD plans but, with no protection until 2020–22, accepts more risk with the long-range threat from Iran. The Obama administration's plan for a European BMD replaces the ground-based interceptors in Poland with an Aegis Ashore capability. In the 2011 fiscal year (FY), the administration plans to reinstate funds cut from the BMD budget in FY 2010.

In the FY 2010 US budget, overall spending on missile defense was cut by 15 percent and ground-based mid-course interceptors are capped at 30 percent. Two boost-phase BMD systems were curtailed—the boost-phase kinetic kill interceptor program was terminated, and the midcourse multiple kill vehicle program was halted. The airborne laser program received lean funding and was made into a test bed for further R&D. Procurement of forward-based radars was halted, and the European missile defense program was put on hold. On the other side, more

funding was invested in Aegis SM-3 and THAAD interceptors, additional Aegis ships, and ascent-phase SM-3s.

A robust, effective missile defense has several virtues. It can devalue adversary ballistic missiles as military investments. This can discourage some from fielding such missiles and provide a boost to arms control efforts. BMD can also bolster deterrence by introducing uncertainty about the effectiveness of an adversary's missile strike. BMD also provides leaders with crisis options in addition to preemption or retaliation. In the event of war, BMD can help to protect the population and critical US and allied assets and provides the only solution when an enemy warhead looms in the air.

One present weakness in US missile defenses is in intercepting cruise missiles. The Missile Defense Agency, faced with the extremely difficult job of developing BMDs, has neglected the work of developing effective cruise missile defenses. Since dozens of countries are armed with tens of thousands of cruise missiles, cruise missile defenses must be supported. Cruise missiles are cheaper than ballistic missiles for potential adversaries to produce or buy and pose a significant and growing risk to the United States and its allies.

Scoping and Dealing with the Nuclear Terror Threat

BMD, while valuable in helping persuade state adversaries, will probably be ineffective against terrorist groups. With non-state actors such as al-Qaeda or one of its global jihad affiliates, direct deterrence based on punishment is less likely to work because there may be no known return address to retaliate against. Such groups may be willing to suffer as martyrs to strike a blow against their perceived enemies. Neither strategic nuclear weapons nor nonnuclear global strike forces will prove useful unless, in the latter case, actionable intelligence was available that would enable decapitation strikes.

Radical terrorist groups may not fear punishment, but they may fear failure. Deterrence via denial may be a viable strategy for thinning the threat of nuclear terrorism. With detectors deployed in layers and capable of reliably identifying special nuclear

material in transit, states may convince potential nuclear terrorists that they are likely to lose their nuclear device or their hard-to-get special nuclear material if they ever develop or deploy such a device.

With regard to deterring WMD use by terrorist organizations, prevention is worth a pound of cure. Once a terrorist group has nuclear weapons, it may be too late to prevent their use. One could foresee a time when a strategic communications program or revolt of more moderate Muslims shifted Islamic public opinion to the view that WMD use was totally unacceptable regardless of the target. If a radical leader were persuaded that use of nuclear arms would shift Muslim opinion decisively against his cause, he might be deterred from such use.

Further, to prevent nuclear proliferation to such groups and their use of nuclear weapons, the United States and its allies could threaten severe retaliation against any state or group that assists the terrorist in attempting to acquire nuclear arms. This could be coupled with accelerated programs to lock down, consolidate, and secure the estimated 1,600 tons of highly enriched uranium and 500 tons of plutonium stored worldwide to prevent their transfer to terrorists or rogue states. Numerous other nonproliferation initiatives, coupled with holding accountable those who aid and abet nonstate actors, can act in combination to negate the potential WMD terrorist threat.

It is striking that the nuclear weapons that play such a large role in the US deterrence posture with state actors appear to have little to no influence in deterring nonstate acquisition or use of WMDs. Other capabilities such as conventional strikes, special operations, economic penalties, and standard counter-terrorist operations also play a part.

On the other hand, some terrorists have been willing to kill thousands and claim the right to kill millions more. They may not be bluffing. Nor do they have a return address that can easily be targeted in retaliation. Possibly, once a terrorist organization has made the decision to acquire a nuclear weapon, the organization may well have crossed the Rubicon toward using it. It is possible that al-Qaeda is unique among terrorist groups in its willingness to inflict mass casualties and, therefore, it should be made an example if the leaders are caught.

However, the likelihood of a nuclear terror attack in the future is unknown, as we have too little real data to make such a judgment. The current presumption of an imminent nuclear attack reflects a lack of evidence and thoughtfulness. This assumption does not suggest dropping defenses or ignoring possibilities, but it does lead to careflessness in our predictions and not assuming a foregone conclusion. Clearly, the brunt of US deterrence efforts needs to be directed against terrorists' supporting actors. Unfortunately, prenuclear terrorist constraints may not apply in a post-nuclear terrorist world, which is all the more reason to press for prevention of the first nuclear terrorist event.

There has been talk of the likelihood of a nuclear terror attack in the next few years. After 9/11 there was a threat identified from a source called "Dragonfire" of a terrorist nuclear weapon in New York. This turned out to be false, but after the 9/11 attack, all such extravagant threats were given more credibility. Later, after the US attacked the Taliban and al-Qaeda in Afghanistan, it was discovered that the al-Qaeda leadership had shown interest in acquiring nuclear weapons and was willing to use them.

In a November 2001 interview, the al-Qaeda leaders Osama bin Laden and Dr. Ayman al-Zawahiri claimed that al-Qaeda had already acquired nuclear weapons. Later, at an October 2002 National Security Council meeting, Pres. George W. Bush announced that the United States had information that al-Qaeda had a nuclear weapon and "jaws dropped around the table."

This was obviously inaccurate, but the alarm was compounded by a lack of good intelligence. The events of 11 September 2001 reflect an intelligence failure, and previous nuclear surprises include a failure to anticipate the nuclear weapons tests by India and Pakistan, to discern the extent of Iraq's nuclear weapons progress finally discovered in 1991, and to catch up to the A. Q. Khan network until very late in its operations. Thus, there is little confidence in advance warning prior to a nuclear terrorist attack.

This situation has led many to state that it is a case of when and not if a nuclear terror attack happens. Interviews indicate that two out of five Americans now think it's likely that terrorists will detonate a nuclear bomb in an American city within five years. During the Cold War fewer thought nuclear war was that

likely. A number of dire predictions have followed from a variety of sources, including some in the US intelligence community. It is interesting that commentators in the United States, not the terrorists, first thought about nuclear terrorism. In 1913 H. G. Wells invented the term *nuclear bomb* and wrote about it in his fiction novels. Scientists in the Manhattan Project almost immediately thought about how nuclear weapons might be used if they fell into the wrong hands.

A number of reasons explain why there is such fear of a nuclear terror attack. The 9/11 attack changed many expectations. Nuclear terrorism now permeates our television programs and popular novels. This public apprehension is also fed by messages of fear from national leaders and a sensationalist news media driven by a 24/7/365 news cycle. A lot of this fear has no basis in actual events or information. The focus on nuclear terror possibilities is largely driven by our imaginations.

While it would be foolish to dismiss the possibilities of nuclear terrorism, little data supports the hypothesis that the threat is imminent. It is possible that al-Qaeda's leaders are bluffing, but they see utility in retaining the language of WMDs to cause fear and obtain attention. This is communicated via the Internet and through press interviews to stir the pot. Images of a nuclear attack on the United States can excite al-Qaeda followers and keep them motivated. Clearly they have shown an ambition to acquire such weapons and the knowledge of how to make or acquire one. They fan the flames of fear by issuing *fatwas* that support al-Qaeda's "right" to kill 4 million, and later 10 million, Americans.

With regard to whether terrorists can be deterred from acquiring and using nuclear weapons, the jury is still out. State sponsors who aid and abet acquisition of a nuclear weapon could be held accountable. Suppliers, scientists, smugglers, and financiers could all be retaliated against and told in advance that they would pay a dear price if authorities discovered they had helped terrorists in their nuclear quest.

Terrorists may be divided on the wisdom of going nuclear and using such WMDs. Indeed, terrorists are not all mindless killers; they tend to calibrate their violence. Threatening or actually killing large numbers can backfire with terrorist group constituencies. Scientists working on a WMD device may begin

to rethink their commitment to such mass killing. Detonating a nuclear weapon in a city could cause group divisions and betrayals and trigger massive counterterrorist activities. Terrorist use of a nuclear weapon could drastically change the rules and lead to draconian measures by threatened or victimized governments. It could lead to the group's loss of sanctuary and support and could turn friends into determined enemies.

Continuing to Strengthen the Air Force Nuclear Enterprise

It was asserted during these proceedings that there are 10 things every Airman should know about strategic deterrence. For example, nuclear deterrence operations are the Air Force's first core function and strategic deterrence is in every Airman's DNA. All Air Force personnel support deterrence either directly or indirectly, and Air Force leaders have played a significant role in developing US deterrence policies and strategies. The US Air Force does not take its nuclear duties lightly. Peace through strength is the primary mission, and deterrence is manufactured every day through sweat.

Capable systems and competent people deliver credible nuclear deterrence. Nuclear weapons demand constant vigilance and must be tightly controlled and made absolutely secure. The United States cannot afford nuclear accidents, incidents, or loss. The nation entrusts the Air Force to provide two legs of the strategic triad and extends deterrence protection to our allies. The Air Force contributes daily to the United States' ability to signal resolve, control conflict escalation, prevent war, and deter adversaries with a myriad of actions, both conventional and nuclear. Precision and reliability mark the quality of US deterrence effects and employment of weapons. The umbrella of deterrence must also extend to US allies and vital interests abroad as well as to the US homeland.

The 2010 Nuclear Posture Review

The 2010 NPR reaffirms the US role of deterrence in preventing nuclear attacks while it also sustains a safe, secure, and

effective nuclear arsenal. The NPR also retains the nuclear triad of bombers, ICBMs, and SLBMs, and the US Air Force maintains the first two of those three legs.

The NPR also noted that ICBMs would carry no more than one nuclear warhead, and under the New START Treaty with Russia, both sides retain an ability to upload nondeployed nuclear weapons. Each side also retains the capability to field dual-capable fighters. Coupled with the increase in funding of the nuclear enterprise, the nuclear deterrent appears to be robust and well provided for.

Russia: New Directions in Nuclear Policy

With the dissolution of the Soviet Union in 1991, the country split into 15 separate republics, with Russia being the largest. The Russian economy immediately slipped into a precipitous decline. The leadership in Moscow now rules a much smaller realm, although one equal to the size of the Russian Empire at the time of Peter the Great. However, despite the loss of territory, weak economy, declining lifespan for men, immense corruption, and other problems of adjusting to new conditions, Russia still retains the vestige of great power so long as it possesses a significant nuclear weapons capability.

Russia has somewhat restored its international position from the depths to which it had sunk right after the Soviet Union dissolved. It will act in accord with its own interests, not the dictates of others. Pres. Dmitry Medvedev's stated foreign policy principles are (1) international law must have primacy; (2) multipolarity should replace the United States-dominated unipolar system; (3) Russia has no intention of isolating itself, seeking friendly relations even with the West; (4) Russia considers it a priority to protect Russians wherever they may be, and Russia responds to any aggressive act against its citizens or Russia; and (5) Russia has privileged interests in certain regions.

Russia has significant security concerns that cause its leaders to rely increasingly upon their nuclear weapons for protection. The southern border with China is of great concern. Russia faces a rising China with 1.3 billion people and a rapidly growing economic and military power. Indeed, the Russian popu-

lation in Siberia and the eastern provinces are vastly outnumbered by the Chinese population just across that border.

To the west, Russian leaders see an expanding NATO encroaching into an area they consider their own sphere of interest as Ukraine and other former Soviet satellite countries are pushing for inclusion. The presence of over 25 million Russian ethnics beyond Russia's borders also has caused Russia to station troops in some of its neighboring states in the so-called near abroad. Clashes between Russians abroad and the newly independent states of the former Soviet Union are potential flash-points that can trigger armed conflict along Russia's borders with these states, possibly involving NATO at some point.

Russians are concerned about the prospect of the United States developing a BMD system in Eastern Europe and elsewhere that could render Russian ICBMs impotent. This led to fierce objections to the relatively light BMD systems proposed for Poland and the Czech Republic, a plan recently rescinded by the United States.

Russian leaders appear to be conflicted in their approach to Iran, wanting influence and lucrative economic ties with the Tehran regime while remaining conscious of the threat Iran could pose with nuclear weapons. The desire to maintain cordial relations and secure profits from trade with Iran has dampened Russian willingness to back strong sanctions against Iran as it approaches nuclear weapons acquisition.

In recent years the Russian economy has rebounded due to a global increase in commodity prices, especially oil and natural gas. Also, a greater sense of order has been imposed by the Vladimir Putin and Medvedev administrations. Unemployment has decreased, and quality of life, particularly in larger cities, has improved dramatically over the dark days following the breakup of the Soviet Union.

For reasons of national pride, Russia's demographic decline, an expansionist NATO, an ascendant China, and a nuclear Iran developing on its borders, Moscow's leaders see their nuclear arsenal as indispensable. Throughout the tumultuous aftermath of the Cold War, Russians believed that it was primarily their nuclear arsenal that maintained Russia's great power status. Given the decline in its conventional military forces since the peak in the 1980s, Russia is increasingly dependent

on nuclear weapons to deter attacks and hold threats at bay. Indeed the Russian strategy is similar to that adopted by the United States and NATO when outnumbered Western forces used nuclear arms to compensate for conventional weaknesses. Attempts to sharply limit shorter-range nuclear arms in future arms control talks will probably be resisted.

Recently, to offset conventional weakness, Russia began modernizing its military equipment and professionalizing its ranks. Its ambitious goal is a 30 percent modernization of all forces by 2015. Nuclear weapons are the protective shield used to guard itself and its interests during this transition to a more capable conventional defense force. As a result, Russia will likely resist any further deep cuts to its nuclear arsenal, specifically in nonstrategic nuclear weapons in arms control talks.

The New START Treaty with Russia is another positive step beyond the Cold War, and the agreed reductions are a reflection of changes in the strategic environment from the Cold War. Under its terms, the United States will field a tremendous nuclear punch and have sufficient numbers of warheads and delivery systems to satisfy strategic deterrence requirements. At the same time, the treaty requires a reduction in the numbers of strategic delivery vehicles and warheads but not to levels that damage the US capability to retaliate in force. Under such limits it would still be a clear mistake for an adversary state to initiate nuclear operations against the United States, its allies, or its interests. The New START Treaty is currently under consideration for ratification by both the US Senate and the Russian Duma.

The New START Treaty allows both sides to deploy up to 1,550 operational warheads on 700 strategic nuclear delivery vehicles (bombers, ICBMs, SLBMs) with 100 strategic nuclear delivery vehicles offline and to use them as backups when others are not in use or available. It was also decided that ICBMs would carry no more than one nuclear warhead, that nuclear bombers will be retained as launch vehicles in the nuclear triad, and that each side preserved the capability under the treaty to field dual-capability fighters. Overall, this is a 50 percent reduction in allowed deployed strategic launchers and a 30 percent reduction in countable nuclear warheads.⁶ This meets the US administration's wish to cap Russia's nuclear

strength in a formal treaty and the Russian goal for putting a similar limit on US nuclear forces.

The treaty imposes no numerical constraints on missile defenses, although it prevents either side from using present ICBM silos for missile defense interceptors—a plan not contemplated by either—and would preserve a wide variety of verification measures for monitoring treaty compliance. For example, each launcher and missile will have a unique identifier, and short-notice on-site inspections are mandated for verifying the number of reentry vehicles deployed on missiles. The Obama administration concluded that it wanted to retain the verification advantages previously acquired by the START Treaty of 2000 and also wanted to avoid letting it expire without a follow-on pact with Russia that requires extensive verification procedures.

Another goal for the treaty negotiation, aside from its technical merits, was to “reset” US-Russian relations by negotiating New START. It had the further merit of giving both Russia and the United States a major arms control initiative to show the world at the May 2010 Nuclear Nonproliferation Treaty Review Conference at the United Nations. This was the centerpiece of US and Russian efforts to show good faith in the Article VI NPT pledge to work toward nuclear disarmament. Despite the end of the Cold War, the negotiations were described as hard and tense, much like earlier Cold War negotiations.

Despite the major media focus on the long-term goal articulated by President Obama of trying to work toward a world free of nuclear weapons, presently there are not arms control proposals on the table between the United States and Russia. The next round of strategic arms reduction talks is likely to focus on attempts to count and limit nonstrategic (tactical or short-range) nuclear weapons. Russia is likely to balk since it has an advantage in numbers of such weapons, perceives a need for maintaining them against states like China and Iran, and sees them as potentially useful in a future crisis with NATO. The follow-on negotiations to the New START Treaty promise to be more difficult than those that led to the current treaty before the US Senate and Russian Duma for ratification.

With regard to another major arms control treaty, the Comprehensive Test Ban Treaty (CTBT), the United States, China, and other states have signed but have not ratified the accord to

make nuclear explosive tests illegal. The US Senate previously declined to ratify the CTBT, and the Obama administration promises to try again. Russia has signed and ratified the treaty, and a major debate exists in the United States over the long-term viability of the nuclear stockpile without testing or modernizing the nuclear devices in the US inventory. At present US policy observes the moratorium on testing pending the outcome of the ongoing policy debate and Senate action. The Obama administration is against further nuclear weapons testing, a policy observed by the last three US presidents.

Coping with Iran's Nuclear Challenge

What are the prospects of deterring a nuclear-armed Iran? This question occurs because efforts to prevent Iran from acquiring nuclear weapons appear to be on the verge of failure.

Unfortunately, the United States' ability to deter Iran from hostile acts throughout the Persian Gulf, the Middle East, or beyond could shrink even more once nuclear weapons are acquired. Iranian leaders may feel that nuclear weapons will greatly lessen the likelihood of direct military intervention by the United States or others and thus give them a freer hand to initiate an even more aggressive policy outside their borders.

US-Iranian history since 1979 has not convinced Iran's leaders that the United States will act with military force when Iran takes belligerent actions that harm US interests and its allies. Iran has taken a leading role in arming and supporting insurgents in Iraq and Afghanistan, resulting in significant US combat deaths. The relatively tepid US response to such actions cannot help but undermine the credibility of future US deterrent threats vis-à-vis Tehran. Many times in the recent past, the United States responded to Iranian provocations with mixed messages which were interpreted by Iran's leaders as unwillingness to act decisively when challenged.

The different culture and worldviews of Iran's leaders when contrasted with US leaders make it difficult to understand and deter aggressive tendencies. Iran's leaders appear to inhabit a culture where resistance is an end in itself, where they sometimes persist in directions that would appear to outsiders as

harmful and dangerous to their own interests. This makes them unpredictable and, in some cases, undeterrable.

The Iranian leadership, while largely hostile to the West, is nevertheless split into various factions, and its governing system is one with multiple checks and balances between factions. At the top of the Iranian system resides the supreme leader, Ayatollah Seyyed Ali Khamene'i, who is the final arbiter of Iran's political, military, and theological issues. He, rather than the more visible Pres. Mahmoud Ahmedinejad, wields decisive power over the use of force. He controls the military and the police forces within Iran.

What kind of leader is Iran's present *velayat-e-faqid*, Ayatollah Khamene'i? His policies and outlook are considered anti-Western and anti-Israeli, yet he is considered less impulsive in taking risks than some of his subordinates. He was at the right hand of Ayatollah Ruhollah Khomeini during the 1979 Iranian revolution that ended the Shah's reign and turned Iran into a theocracy. It is said that he occasionally suffers from bouts of depression and will sometimes consult a religious fortune-teller to make critical decisions. His botched handling of the most recent presidential election and the resulting nationwide unrest have been noted as examples of his losing touch with the Iranian population and increasingly siding with extremist elements of his government.

If the United States expects to deter Iran, clear red lines for the most threatening aspects of potential Iranian behavior need to be defined and plainly declared to the regime. Consequences for crossing those lines will also need to be threatened and then pursued if necessary. Finally, due to previous failures in deterring Iranian actions toward acquiring a nuclear weapon, the United States will need to maintain its missile defense asymmetry and clearly demonstrate how vulnerable Iran would be if it attempted to attack the United States.

North Korea: Meeting Its Nuclear Challenge

The North Korean government under Kim Jong Il is a failing state with a small nuclear weapons capability. This fact shows that even the poorest of countries can achieve nuclear weapons capability given enough time and political will. Clearly, the

North Korean economy has failed. Inadequate food supplies feed the population, and thousands die of starvation each year. The disparity is stark between the prosperity of the ROK and North Korea. The ROK's gross national product is 15 times greater than North Korea's. The North Korean government is totalitarian and ruled with an iron hand by its dictator and his party. An estimated 200,000 political prisoners are in North Korea's gulags.

Although a cease-fire has remained in place since 1953, a legal state of war still exists between the North Koreans and their neighbors to the south, who are allied with the United States. The demilitarized zone between the two Koreas is the most heavily militarized border in the world, and a war between the two would likely be a bloodbath that could kill hundreds of thousands, perhaps millions.

North Korea has recently exploded two nuclear devices, and unclassified estimates of how many nuclear weapons are in its possession range from five to 20 weapons, with perhaps two to 12 reliable ones, to five to 10 weapons and two to six reliable ones. In addition, the regime is suspected of having hundreds of tons of chemical munitions and perhaps many kilograms of biological weapons. North Korea probably has acquired the nuclear capability to deter any outside intervention and interference.

Roughly a quarter of the South Korean population lives in the capital city, Seoul. Given the massed rockets and artillery the North Koreans possess near the demilitarized zone, if they ever attacked Seoul with conventional weapons, the carnage would be catastrophic, even more so if the attack were nuclear. For example, a single 10-kiloton nuclear weapon exploded in a ground burst inside the Seoul city limits is predicted to cause 180,000 fatalities and another 160,000 injuries—340,000 casualties in all. Studies indicate that a single 50-kiloton weapon would kill and injure four times that number. Neighboring countries like Japan would also endure casualties from radiation clouds that deposit their loads downwind.

It would be prudent for US and ROK war planners to assume that North Korea would use nuclear weapons if war began. A number of scenarios show North Korean leaders might order the early use of nuclear weapons. At the start of a conflict, they might choose to signal their willingness to use nuclear arms by

detonating a high-altitude air burst designed to optimize electromagnetic pulse effects, possibly destroying power grids and electronic circuitry. This might be seen as a way to level the playing field against the otherwise superior ROK and US forces stationed in South Korea. If nuclear weapons were not used at the start of a war, and the North Korean invasion failed, concessions might be coerced by demonstration explosions and by threatening nuclear attacks on Seoul, Pusan, and other major ROK cities. Or more dangerous still, North Korea may opt to escalate even more by attempting a decapitation strike or counter-city campaign to try to break the will of the ROK leadership and people. Finally, if the North Korean regime in Pyongyang were falling from internal divisions or were about to be defeated by ROK/US forces, the North Korean leadership might opt for revenge strikes against ROK and Japanese cities.

It would be a tragic mistake by US and ROK war planners to assume that North Korean leaders would be deterred from using nuclear weapons because they lacked escalation dominance. In some situations, North Korea might initiate nuclear weapons exchanges to secure military advantages, achieve a fait accompli, however temporary, and/or exact revenge for what it believed to be an impending loss in the war.

How well would counterforce work against North Korea and its nuclear forces? Some have suggested that once North Korea uses nuclear weapons on another country, the United States should simply “blow North Korea back to the Stone Age.” This ignores several problems. First, would the United States really want to kill millions of innocent civilians? Would the South Korean government approve of this massive killing of its countrymen? Would neighboring states like China, Japan, and South Korea tolerate lethal fallout raining down from such attacks? Even targeted attacks against North Korean leadership could complicate the attempt to terminate the conflict and unify Korea. Finally, selective attacks against the North Korean leadership might be only partially effective due to sheltering, mobility, and dispersals.

These dynamics demonstrate the difficulty in deterring a desperate and losing adversary. To accomplish this, the United States and its allies need to frame a question in the minds of the North Korean leaders: Is the regime more likely to survive with

peace or war? There would be a need to convince North Koreans that a prospective or continuing war is not winnable and that their relatively modest nuclear weapons force can be negated or defeated. In such a case, the United States should drive them toward the least bad option, a peace settlement rather than a far more disastrous war.

However, the United States needs to work on its credibility vis-à-vis Pyongyang's leadership. Past US and ROK threats of retaliation have not been followed by decisive action when North Korea has crossed so-called red lines, such as with its missile and nuclear trade with states like Syria, Myanmar, Libya, and Iran. Nor has the 2010 sinking of a South Korean ship caused major allied military responses. North Korea has not been penalized for launching missiles through Japanese airspace or for testing two nuclear devices in violation of its earlier pledges to observe the NPT. Each provocation has been allowed to stand without a major response. This does little more than embolden the North Korean leadership in future confrontations. To deter such actions, the United States and the ROK need to demonstrate both capability and will. One without the other leads to deterrence failure.

It is likely that Kim Jong Il and his small group of leaders at the top of the North Korean regime's pyramid are engaging in such provocations to shore up leadership at home, demonstrating that he and his clique remain powerful and in control. Things like the provocative missile and nuclear tests may be intended to enhance their regime reputation for strength and facilitate the power of the leader(s) to keep internal power competitors at bay. Also, such actions may seek to deter foreign intervention and to extract international aid and concessions. Clearly, vague US and ROK threats of sanctions and retaliation have not been enough to stop such provocations from a risk-taker like Kim Jong Il.

The North Korean regime is imperiled by its own domestic economic failures, yet it still poses a significant and growing WMD threat to the ROK and the region. This threat may be greater than presently appreciated as there are still dangerous scenarios where it might use its small stockpile of nuclear weapons. The United States and the ROK need a deterrence strategy that differs from earlier Cold War strategy. Since the

North Korean nuclear weapons total is small, this strategy must place more emphasis on the ability to deny nuclear effects should an attack take place. Such a small nuclear threat might be destroyed prior to launch and intercepted on the way to target. If so, a doctrine of deterrence by denial, augmented by the more traditional deterrence by threat of massive retaliation, could cause the North Korean leadership to elect peace and not war, or at least conventional and not nuclear combat.

In conclusion, a US/ROK strategy must hedge against a failure to dismantle the North Korean program. Such a strategy must also avert allied proliferation in response to North Korean proliferation. There will be a need to convince allies through word and deed that the United States will provide an extended deterrence umbrella to protect it from attack and respond if it is attacked.

Nuclear Weapons in a Turbulent Pakistan

Pakistan is a nuclear weapons state faced with a Taliban insurgency and is a safe haven for al-Qaeda's leaders. There are dual fears regarding Pakistan. Some fear that its nuclear weapons will fall into the hands of a terrorist group either through theft or by regime change. In addition, as long as al-Qaeda's leaders are at large, they may plan and execute an attack, perhaps with WMDs if available, on the United States, its vital interests, or its allies. Pakistani help in finding and neutralizing this threat is extremely important.

Pakistan is a country beset by both radicalism and terrorism. It has a large population which is poor by world standards, and its government is often dysfunctional. Pakistan relies on foreign aid and receives between \$1.5 and \$2 million in security assistance from the United States each year. The per capita annual income is around \$1,000 per person. In domestic politics, the Pakistani army frequently intervenes to run affairs. Civilian control of the military is weak, and the army is the most respected institution in Pakistan. Army officers are better educated than the average Pakistani, and the army is large and politically powerful, taking an active part both in security and economic affairs.

Pakistan's economy depends on agriculture, especially cotton. There is a low rate of tax collection, so there is a low government investment in productive assets, education, and health care for the population. After 9/11 the United States once again established a partnership with Pakistan to oppose al-Qaeda and the Taliban and to deny a sanctuary to terrorists in Afghanistan and Pakistan. In the past eight years, Pakistan has rebounded with renewed flows of foreign assistance and a restructured sovereign debt.

Another concern regarding Pakistan is the possibility of war with India. After the British withdrew, one legacy of the partition of South Asia was more than three wars, mostly focused on the dispute over Kashmir, a province both claim and currently governed by India. Nuclear weapons likely will deter any rational Indian or Pakistani leaderships from using such weapons since both will hold each other hostage. On the other hand, leaders do not always act rationally, and a clash between the two states could go nuclear, leading to a mass casualty situation.

A. Q. Khan, the "father" of Pakistan's nuclear weapons program, led a clandestine nuclear weapons marketing program that sold weapons technology and expertise to Libya and Iran and perhaps to other states. He probably did not act alone. Some others in the Pakistani leadership may have profited from this nuclear black market enterprise. Khan was dismissed from his post at his Kahuta laboratory complex, forced to confess and apologize in public, and put under temporary house arrest. However, he did not lose his wealth and now is free. He remains a hero in Pakistan, more popular than Pakistan's political leaders. He is seen as the one, more than any other, who created a Pakistani nuclear weapon capability to be used to deter India, a rival with far superior conventional military power.

Pakistan views India as its primary national security threat; the two countries have engaged in several military confrontations throughout the past 60 years. With both countries maintaining nuclear weapons, this situation could either lead to stability through mutual deterrence or to escalation.

US and Pakistani relations have undergone three marriages and two divorces over the years. The break in the early 1990s

was due to Pakistan's nuclear weapons program and its negative effect on US nonproliferation efforts. The on-again-off-again nature of the relationship has made Pakistanis wary of American long-term commitment. Pakistan needs strong outside friends for help with its security and economy. The United States needs Pakistani support in Afghanistan in rooting out the terrorist threat posed by al-Qaeda. The US aid and military reimbursements to Pakistan totaled \$3.054 billion in FY 2010 and FY 2011.

US goals do not perfectly match those of Pakistan, but mutual dependence does provide a reason for dealing with each other. Since 9/11 there has been dependence on both sides but different priorities in Afghanistan. Some Pakistanis want to go easy on Islamic radicals because they are useful warriors to Pakistan in its armed quarrel with India in Kashmir. Pakistan also wants to be able to use Afghanistan as a fallback region for an Indian invasion of Pakistan, since Pakistan has little strategic depth. Anti-Americanism is common in Pakistan, and the presence of radical *madrassas* produces many extremist graduates that threaten Pakistan and regional stability, providing fighters to the Taliban and support for al-Qaeda in both Afghanistan and Pakistan.

The ultimate fear is that Pakistan will become a failing state with nuclear weapons that could fall into the hands of a radical who would replace the present government or somehow become available to terrorists. The authority of the Pakistan government has been challenged by insurgents and appears to be eroding with the rise in popularity of religious parties and militant groups. The assassination of Benazir Bhutto was a warning. The United States is working to increase stability via cooperation with Pakistan in this struggle and to keep Pakistan's nuclear weapons from falling into the wrong hands.

Combating Illicit Trafficking in WMDs

Terrorists like al-Qaeda have shown an interest in acquiring nuclear weapons, as have several rogue states. Illicit nuclear technology or radiological material trafficking is a potential acquisition pathway to nuclear weapons capability and can pro-

vide warnings and indicators of possible adversary use of nuclear weapons.

Stopping the trafficking is difficult. Trafficking intelligence is often limited, but the United States is aware of thousands of illicit nuclear trafficking incidents. Most involve attempted transfers of low-grade uranium not enriched enough to produce an explosive yield. Many incidents involve bogus materials and meaningless paper documents, although a few incidents have involved genuine weapons-grade materials like plutonium. After 9/11 the number of nuclear trafficking incidents increased for a few years but is now decreasing. However, following up and reporting on nuclear smuggling incidents are critical, as one nuclear weapon in the wrong hands could inflict substantial damage.

The State Department Export Control and Related Border Security (EXBS) program is a foreign-assistance program that helps to strengthen strategic trade control systems. It deals with partners in 70 countries and has 22 advisors living abroad. This program helps partners to deter, detect, pursue, and prosecute nuclear smugglers. EXBS assesses country capabilities and provides targeted training on trade-control legislation, licensing, government-industry outreach, and enforcement techniques. EXBS also organizes conferences for policy makers and experts to share information and best practices, providing about 300 training sessions and \$12 million worth of inspections and detection equipment each year.

Another State Department program, the Nuclear Smuggling Outreach Initiative, also partners with allied and other countries to improve programs to combat nuclear smuggling and provide threat assessments, develop joint action plans, and help prioritize antitrafficking initiatives. Similar work takes place in the Department of Energy's Second Line of Defense program. The program provides training and detection equipment to partner nations along their borders at points of entry or exit. Program goals include equipping approximately 650 sites at borders, airports, and seaports in 30 countries. The US megaports initiative has been expanded to cover partner countries worldwide.

Conclusion

There are several types of nuclear catastrophes to avoid. In the worst case, a central nuclear war with another great power such as Russia or China must be avoided. In addition, we must prevent a nuclear terrorist attack on a US or allied city and avoid a nuclear attack against forward-deployed US/allied forces or against an allied state.

Pres. John F. Kennedy and his advisers estimated that by the beginning of the twenty-first century the world might have as many as 30 nuclear weapons states. Instead it has less than 10. Something must have thinned out the nuclear threat that President Kennedy did not anticipate in the early 1960s.

Nonproliferation efforts like the NPT have worked to an extent. Extended deterrence by the United States has also helped. Some states, like Argentina and Brazil, had a regime replacement where the new leadership abandoned the nuclear weapons quest for internal political reasons. Romania's clandestine nuclear weapons program was terminated when its leader was overthrown. The Israeli attack on the Iraqi Osirak reactor in 1980 retarded that program. The defeat of Iraq in the 1991 Gulf War and the subsequent inspections and dismantlement programs ended a serious Iraqi nuclear weapons program.

Pressure from the United States and others helped curb the nuclear weapons programs of some countries. Other states actually rolled back their nuclear programs and eliminated their weapons for other reasons. Ukraine, Belarus, and Kazakhstan relinquished their weapons to get aid for their economies and avoid the cost of maintaining them. South Africa saw the Soviet threat recede and did not wish to pass the nuclear weapons on to a successor regime manned by its domestic foes.

One means of reducing the nuclear threat is through nuclear nonproliferation measures. In these the DOD is in a supporting role to others such as the Department of State. These include (1) creating and enforcing nuclear arms control and disarmament treaties and agreements, (2) regulating trade in nuclear technologies via nuclear export control regimes, (3) interdicting shipments of illicit nuclear weapons materials or delivery systems, (4) passing legislation to criminalize the manufacture or possession of nuclear weapons or nuclear weapons

components in the state's territory, (5) creating programs to dismantle and secure nuclear weapons and nuclear materials (for example, the Cooperative Threat Reduction Program), (6) funding programs to enhance border security, (7) pursuing initiatives to defeat nuclear terrorist activities and illicit nuclear materials trafficking, and (8) exerting diplomatic and economic pressure to secure cooperation.

Supporting nonproliferation efforts, US counterproliferation programs led by the DOD can reduce some nuclear threats through deterrence, active and passive defenses, and preventive offensive operations. Finally, should these efforts fail to prevent a nuclear attack, well-organized, planned, and equipped consequence management responses may be able to mitigate the effects of such attacks to some degree.

While the nuclear threat cannot be eliminated entirely, the United States and its allies may be better able to avoid a nuclear catastrophe using this combination. No single element of these three programs is a silver bullet capable of ending all nuclear threats, but working in unison, this collection of strategies and programs offers a chance to keep nuclear warfare and terrorism at bay.

Notes

1. Barack Obama, "Remarks by President Barack Obama in Prague" (address, Czech Republic, Prague, 5 April 2009), http://www.whitehouse.gov/the_press_office/Remarks-By-President-Barack-Obama-In-Prague-As-Delivered.

2. "Avoiding a Nuclear Catastrophe" was sponsored by the USAF Counterproliferation Center, Air Force Research Institute, Defense Threat Reduction Agency, and USAF Strategic Plans and Policy Division (AF/A5XP). It was held at the Air War College, Maxwell AFB, Alabama, 18–19 August 2010. Fifteen speakers discussed issues with 420 attendees from 41 countries.

3. The Defense Threat Reduction Agency (DTRA) works with the US military, Department of Homeland Security (DHS), Federal Bureau of Investigation, Department of Education, and Department of State to provide assistance in each of these realms. DTRA works with such nonproliferation programs as the Nunn-Lugar Global Cooperative Initiative and the Cooperative Threat Reduction program in the former Soviet Union and arms control verification program assistance. Other DTRA offices work on illicit trafficking in WMD technology in each of the areas of responsibility of the combatant commands. DTRA also works in cooperation with DHS and DOD on nuclear

detection and forensics technology. In the area of passive defense, DTRA scientists work on various projects related to chemical and biological defense programs. In the area of offensive operations, DTRA works on hard-target kill technologies and reach-back capabilities for supporting the forward-based war fighters in combat. These are just a few examples of the myriad of projects and supporting programs for combating WMDs in this agency with 1,900 employees and an annual budget of around \$2 billion.

4. For example, the Nuclear Nonproliferation Treaty, the Chemical Weapons Convention, the Biological Weapons Convention, the Outer Space Treaty, the Seabeds Treaty, the New START Treaty, the Cooperative Threat Reduction Program, the Comprehensive Test Ban Treaty, and the INF Treaty are a few programs designed to control nonproliferation. This also includes the Australia Group that attempts to regulate the transfer of technology that would help states and groups acquire chemical and biological weapons, the Nuclear Suppliers Group that seeks to prevent nuclear weapons technology transfers, and the Missile Technology Control Regime that attempts to stem the transfer of missile technologies.

5. In addition to each country's border controls and internal police forces, this includes an international group of states that work together in the Proliferation Security Initiative program.

6. The United States and Russia will retain their strategic triad of bombers, ICBMs, and SLBMs. One US plan to meet new treaty limits is to deploy 420 ICBMs (currently 450), 60 nuclear-capable bombers (currently 94), and 240 SLBMs deployed at one time (currently with a capacity to deploy up to 336). The United States will keep all 14 of its fleet ballistic missile submarines but will maintain only 20 operational launch tubes per SSBN instead of the present 24 for each submarine.

Abbreviations

ALTBMD	active layered theater ballistic missile defense
BMD	ballistic missile defense
CSAF	chief of staff of the Air Force
CTBT	Comprehensive Test Ban Treaty
DHS	Department of Homeland Security
DOD	Department of Defense
DTRA	Defense Threat Reduction Agency
EXBS	Export Control and Related Border Security
FY	fiscal year
ICBM	intercontinental ballistic missile
ISR	intelligence, surveillance, and reconnaissance
NATO	North Atlantic Treaty Organization
NPR	Nuclear Posture Review
NPT	Nonproliferation Treaty
PAC	patriot advanced capability
PGM	precision guided munition
R&D	research and development
ROK	Republic of Korea
SLBM	submarine-launched ballistic missile
SM	standard missile
SSBN	ballistic missile submarine
START	Strategic Arms Reduction Treaty
THAAD	terminal high-altitude area defense
UAE	United Arab Emirates
WMD	weapon of mass destruction

Avoiding a Nuclear Catastrophe
Summary Report

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