



DEFENSE DOSSIER

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ISSUE 14

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FROM THE EDITORS

Welcome to the June 2015 issue of AFPC's Defense Dossier. In this edition, we return to our periodic focus on ballistic missile threats, and the state of America's defenses against them.

Missile defense has gained new salience in recent months. The Summer 2014 Gaza War between Israel and the Hamas terrorist group showcased Israel's new theater defenses - and highlighted the enduring benefits of missile defense, both on a political and on a strategic level. Meanwhile, the ballistic missile threat posed by America's adversaries and strategic competitors is steadily growing, elevating the urgency of a robust response.

To address these issues, AFPC convened the annual installment of its Capitol Hill conference on "Missile Defense and American Security" in February of 2015. The event featured top experts and practitioners in the fields of missile defense and proliferation. The articles in this edition of the Defense Dossier are drawn from their presentations.
Sincerely,

Ilan Berman
Chief Editor

Richard Harrison
Managing Editor

THE IMPORTANCE OF MISSILE DEFENSE

SENATOR MARK KIRK

Missile defense is of critical importance to U.S. national security. It underpins every policy option we have for defense against aggressors with missiles. It gives us the ability to act with tact and precision against nuclear-armed aggressors, rather than succumb to the cold logic of mutual assured destruction (MAD).

During the Cold War, there was no established missile defense architecture to guard against the threat of nuclear-armed missiles. In the Pentagon, it was typical to go through standard war games where the United States would simply absorb nuclear hits and be unable to respond to simulated missile attack. Seeing this as a young watch officer convinced me that we should not be defenseless. The President of the United States should have more options than simply resorting to massive retaliation or doing nothing.

Because of the nature of the growing missile threat, missile defense is a homeland security issue that requires a global response. Developing the capability to knock down incoming missiles, even those that are covertly launched, is the only credible way to improve our national security against missile proliferation. A major element of missile defense requires the cooperation and vigilance of our allies and the ability of our military to act freely within the global commons.

Missile defense is now practical in protecting our homeland and our allies. In the Middle East, technology jointly funded by the United States has been integral in protecting Israel. The Iron Dome missile defense system has repeatedly saved the lives of countless Israeli civilians from Hamas rocket attacks. U.S. involvement in the Iron Dome project is an example of the unwavering support and commitment of the United States to Israel's security, and a concrete demonstration that our great democracy

from across the sea was protecting a fellow democracy and ally.

In Europe, the United States and NATO have designed and begun construction on a missile defense shield that would deter and defend against a missile launch from Iran. Such a strike would have to pass over Romania, which is why we and NATO have been building a site at Deveselu to ensure that the United States and NATO have the necessary capabilities to knock down anything that is launched by the Islamic Republic of Iran. Our capability to deter and defeat such a threat is absolutely essential to our security, and should not be limited by political quarrels. We cannot afford to scale back our defense and that of our allies in order to appease revisionist states like Russia.

In the Asia-Pacific, missile defense is equally vital to deterring rogue states like North Korea. Again, we are speaking about an unpredictable actor. We must have the capability to track and monitor missile launches from North Korea without warning and within a timeframe not of days or hours, but of minutes.

The United States needs to continue to improve its missile defense program, particularly at domestic sites like Fort Greely, Alaska, where our interceptor inventory plays a crucial role in determining America's response options. We need to invest the time and money in a missile defense system that is a fully functioning deterrent to rogue actors. We need to give our commander-in-chief the capability to deal with that most harrowing of scenarios with confidence and with knowledge that we have many options besides massive retaliation. ■

U.S. Senator Mark Kirk (R-IL) chairs the Senate Appropriations Subcommittee on Military Construction and Veterans Affairs as well as the Senate Banking Subcommittee on National Security & International Trade and Finance.

THREAT AND RESPONSE

MISSILE DEFENSE AS EXISTENTIAL REQUIREMENT

DANIEL GOURE

The growing threat posed by ballistic and cruise missiles in the hands of America's enemies and competitors evokes Winston Churchill's trenchant observation about this country: "You can always count on Americans to do the right thing - after they've tried everything else." Since the idea of developing a defense against such weapons was raised by President Ronald Reagan in 1983, the United States has tried every other way of addressing this threat short of serious missile defenses. While arms control has radically reduced the central threat posed by the Soviet Union's massive nuclear arsenal, the prevailing vision of "Global Zero" is, if anything, farther away today than it was when President Obama took office. Nuclear weapons states are designing and deploying ever more capable launch systems and missiles. New players, both so-called rogue regimes and terrorist groups, have acquired arsenals of ballistic missiles. Having tried everything else, it is time to get serious about missile defenses both at home and abroad.

A QUICKENING TEMPO

We are fortunate, in a sense, that for a long time our rather lackluster pursuit of defensive capabilities was matched by the slow pace of threats. The final report of the 1997 Commission to Assess the Ballistic Missile Threat to the United States, the so-called Rumsfeld Commission, warned that adversaries such as North Korea and Iran could deploy a long range ballistic missile, including one capable of reaching the United States, within five years of the decision to do so.¹ This has not yet happened. Russia, too, was held back from modernizing its strategic nuclear arsenal for more than a decade by domestic political instability and a lack of resources. But this slow-motion evolution of the threat appears to have ended. Our adversaries are picking up the pace. Consequently, so must we.

With respect to North Korea, the timeline of the Rumsfeld Commission may have been off somewhat—but the trajectory was not. The DPRK has made rather steady (if slow) progress not only towards acquiring and improving their nuclear weapons but on the development of a variety of delivery systems. The past several years have seen a notable acceleration of Pyongyang's activities in this arena, to include the successful test of an ICBM surrogate as a space launch vehicle and, perhaps most alarming, of a submarine-launched ballistic missile. One long-time observer of the DPRK's weapons of mass destruction programs warned recently that North Korea may have as many as 100 nuclear arms in five years and become capable of mounting them on a range of road-mobile missiles.²

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The Rumsfeld Report warned that the pace of nuclear arms and ballistic missile programs among would-be weapons states could be substantially increased through assistance from other, more advanced countries. In his most recent testimony to Congress, Director of National Intelligence Admiral William Clapper was particularly pointed in his remarks about North Korea's role as a proliferator:

North Korea's nuclear weapons and missile programs pose a serious threat to the United States and to the security environment in East Asia. North Korea's export of ballistic missiles and associated materials to several countries, including Iran and Syria, and its assistance to

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Syria's construction of a nuclear reactor, destroyed in 2007, illustrate its willingness to proliferate dangerous technologies.³

There is something particularly frightening about the intersection of a young and inexperienced leader and his country's expanding arsenal of nuclear weapons and long-range ballistic missiles.

*By the end of the decade, Iranian missiles could be capable of reaching Western Europe and possibly even the east coast of the United States.*⁴

Similarly, Iran has kept its eye on the ball with respect both to developing the infrastructure and knowledge with which to build nuclear weapons and increasing the number and sophistication of its ballistic missile forces. Tehran now has the largest arsenal of ballistic missiles in the region. Its longer range missiles can already reach Saudi Arabia, Israel and Turkey. By the end of the decade, Iranian missiles could be capable of reaching Western Europe and possibly even the east coast of the United States.⁴

For the first time since the end of the Cold War, the specter of great power confrontation and conflict is again dominating our strategic considerations. Asked by an interviewer whether she takes Russian President Vladimir Putin at his word that he wants peace, National Security Advisor Susan Rice responded "How dumb do I look? No. In all seriousness, no."⁵ As if on cue, the new Secretary of Defense, Ashton Carter, made public what had already been known among defense and intelligence analysts: that Moscow was guilty of violating the 1987 Intermediate Nuclear Forces Treaty. "Russia's continued disregard for its international obligations and lack of meaningful engagement on this particular issue require the United States to take actions to protect its interests and security, as well as those of its allies and partners," Carter disclosed.⁶

Significantly, among the responses proposed by Carter to Russia's treaty violation is "active defenses to counter intermediate-range ground-launched cruise missiles." This statement suggests the possible deployment of such U.S. capabilities as the Joint Land Attack Cruise Missile Elevated Netted Sensor System (JLENS). In addition to the planned deployments of the Aegis Ashore as part of the European Phased Adaptive Architecture, the positioning in Eastern Europe of additional Patriot air and missile defense batteries and the new THAAD missile defense system could significantly counter Russian threats.

Russian aggression in Europe, the resumption of Cold War-era "practice" strikes by Bear bombers on European and U.S. cities, and threats to renuclearize Crimea, would carry a less ominous imprimatur were it not for Moscow's massive and sustained program to modernize its strategic missile forces. The 2010 New Start Agreement allowed Russia in essence to complete its modernization program as well as retain first strike capabilities such as a heavy ICBM. Russian leaders have announced that they intend to completely modernize their strategic nuclear forces by 2020, decades ahead of the United States.

Russia currently deploys some 500 strategic launchers with about 1,900 nuclear warheads. Its Strategic Rocket Forces are estimated to have 305 ICBMs that carry 1166 warheads. These include the heavy SS-18 Satan and its replacement, the Sarmat (no NATO designation yet) and the Topol-M, a multiple warhead missile that is being deployed in land and rail-mobile configurations as well as in silos. The strategic submarine fleet consists of 8 Delta class SSBMs that carry 128 SLBMs with 512 nuclear warheads. A new ballistic missile submarine, the Boray has entered the fleet. It is anticipated that this new class of SSBNs will eventually be equipped with the Bulova SLBM.⁷

Russia also maintains a massive, albeit aging, arsenal of theater nuclear weapons. These include short-range ballistic and cruise missiles as well as gravity bombs and even nuclear torpedoes. The centerpiece of Russia's 21st century theater ballistic missile force is the SS- 26

Iskander, intended as a replacement to the venerable SCUD. The SS-26 is a highly accurate mobile theater ballistic missile armed with a range of conventional warheads including unitary, submunition, fuel-air explosive, earth penetrator and EMP as well as a nuclear warheads.

In what must be the height of strategic irony, the United States Air Force is helping to fund Russia's strategic modernization efforts. Currently, the United States is dependent on a Russian first stage engine, the RD-180, to power its premier heavy lift launch vehicle, the *Atlas V*. Moscow could increase the price or even cut off access to this engine at any time. Congress has directed the Air Force to end all purchases of the RD-180 by 2019 and develop and acquire a U.S. alternative.

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China, for its part, has steadily modernized its long-range missile force while devoting more attention to increasing both the quantity and quality of its arsenal of theater ballistic and cruise missiles. Included in this array are anti-ship cruise missiles and the infamous "aircraft carrier killer," the DF-21. The PLA's arsenal of well over 1,000 theater ballistic and cruise missiles is capable of overwhelming the limited number of U.S. and allied bases in the region. According to the latest report by the U.S.-China Economic and Security Review Commission:

Since the mid-1990s, China's offensive missile force—the Second Artillery—has added significant conventional strike capabilities; previously, the force had been comprised of only nuclear ballistic missiles. During this period, the Second Artillery has developed and fielded a robust and modern

short-range ballistic missile force. The force also has introduced conventional medium-range ballistic missiles, intermediate-range ballistic missiles, antiship ballistic missiles, and ground-launched land-attack cruise missiles designed to counter key aspects of U.S. military power. Meanwhile, China has gradually modernized and expanded its nuclear strike capability by deploying its first road-mobile intercontinental ballistic missiles and its first credible sea-based nuclear deterrent capability.⁸

Then there are the so-called non-state actors. During last year's conflict, the Gaza-based terrorist group Hamas conducted a massive bombardment of Israel employing not only its traditional homemade, short-range rockets but sophisticated longer-range missiles capable of hitting Israel's major cities. Around the same time, a drone believed to be of Iranian origin was shot down after penetrating Israeli airspace. Most recently, Western intelligence agencies reported that the Syrian regime had begun using SCUD missiles with their 1,000 lb. warheads against domestic freedom fighters. In 2006, Hezbollah was estimated to have had about 13,000 short- and medium-range rockets. Today it could have several times that number including long-range systems with greater precision.

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This country's current or prospective adversaries, in other words, are in the midst of major programs to increase both the quantity and quality of their respective ballistic missile arsenals. Unless the United States is willing to be driven away from regions of interest and off the high seas, it needs to get serious about both national and theater missile defense. ■

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ISRAEL'S IRON DOME: LESSONS FOR THE U.S.

MICHAELA DODGE

Israel's Iron Dome air-defense system has rocketed to prominence in the wake of last summer's conflict between the Jewish state and the Hamas terrorist group. In that war, Iron Dome played a decisive role in intercepting and neutralizing missiles fired at Israeli population centers. In the process, it profoundly altered the dynamics of that conflict—and future ones involving Israel. But what can the U.S. learn from Iron Dome?

GAZA WARS: THEN AND NOW

To appreciate the Iron Dome effect, one needs only to compare last year's conflict with the earlier 2006 Israel–Hamas war. Back in 2006, terrorists fired rockets and anti-tank missiles with the specific aim of killing civilians. In Israel, this translated into sirens just about every hour of the day. Each time, Israelis are required to run to a shelter as fast as they can. Forty-four civilians died as a result of the shelling, and Israelis demanded action. The Israeli government was forced to respond rapidly, perhaps without having enough time to think through the steps necessary to de-escalate hostilities as quickly as possible. In all, over 100 soldiers died in the military action aimed at preventing those rocket attacks.

In 2014, Israel again found itself under attack by rockets, shells, mortars, and short-range missiles. Roughly a thousand of these salvos were launched in the span of about two weeks. During that period, terrorists actually increased the rate of fire on Israeli citizens in an apparent bid to get the Israeli government to mount a hasty military response. Hamas forces were dug in and ready for such an attack. A hasty response would undoubtedly have resulted in more Israeli casualties.

Fortunately, the situation was different this time around. In the years since the 2006 conflict, the Israel government had developed and deployed the Iron Dome air-defense system. The system itself was designed in Israel, with the U.S. government providing substantial resources for its procurement. It quickly proved its battlefield effectiveness. In the 2014 conflict, Iron Dome intercepted about 80 to 90 percent of rockets, short-range missiles, and shells fired at Israeli population centers.¹

Importantly, the Iron Dome system does not engage all incoming rockets. Rather, it can discriminate, recognizing whether an incoming weapon is headed toward a protected area, and shoot it down when it is. Enemy missiles that do not threaten high-value targets are left to land where they do not threaten anyone. This mechanism gives Israel the opportunity to save Tamir interceptors, which cost about \$40,000 to \$50,000 apiece. This price-tag reflects development and manufacturing costs, and as Israel continues to purchase interceptors, it will doubtless decrease further.

But even before then, Iron Dome has raised the costs of aggression for Israel's enemies. Before the system was deployed, groups like Hamas would smuggle rockets and mortars one by one and launch them as they obtained them. Now, the situation is more complicated. In order to have a chance of penetrating Iron Dome, Palestinian terrorist groups must launch more rockets, usually in salvos—something that is a considerably more expensive proposition. It is also a more dangerous one, because stockpiling missiles increases the costs of detection and interdiction by Israeli security forces. The alternative is to use fewer, more precise rockets, but doing so is considerably

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more expensive because of the need to procure more advanced technology. Either way, the Iron Dome system increases the cost of an attack.

Despite these successes, however, some analysts have maintained that the system does not work.² They tend to base their claims on analysis of the contrails of incoming rockets. The evidence, however, points to an opposite conclusion. Contrails can be deceptive, and it is clear that the Israeli military is collecting data to improve the Iron Dome's algorithms. Both insurance claims and casualties related to ballistic missile attacks have dropped by an order of magnitude since the Iron Dome was deployed, providing a further indication that publicly released data are correct.

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A REAL AND ADVANCING THREAT

Why should the United States care about the Iron Dome and how it affects the dynamics of conflict in the Middle East? After all, one might think, Israel is far away, and so are adversaries with ballistic missiles that could reach the United States.

In reality, the worldwide ballistic missile threat is both real and advancing. There are now over 30 countries with ballistic missiles, and many of them have hostile intentions toward the United States. Some of these countries threaten the United States or its allies quite openly.

For example, North Korea publicly threatened the United States with a nuclear attack in 2013. In 2014, Hwang Pyong-So, Director of the North Korean military's General Political Bureau, called the White House and the Pentagon "the sources of all evil."³ In

January 2015, North Korea threatened the U.S. with "final doom."⁴ North Korea put a satellite into orbit in 2012, and the technology for doing so is similar to the technology needed to deliver a nuclear warhead. (Iran similarly put a satellite into orbit in January 2015.⁵) While it might be tempting to dismiss statements like those of North Korea as silly, a sound national security policy would treat them at least with caution. The United States, however, could well find itself facing far more formidable adversaries.

In 2013, for example, China released a map showing radioactive fallout on the West Coast of the United States that would be caused by a Chinese nuclear attack, presumably with nuclear-armed submarines.⁶ Russia has launched its most extensive nuclear weapons modernization program since the end of the Cold War (and since the New Strategic Arms Reduction Treaty entered into force). Moscow threatens the United States and the North Atlantic Treaty Organization so often that U.S. leaders no longer even pay attention. But the success of the Iron Dome teaches us that if you build a comprehensive layered missile defense system, you make it more difficult for your adversaries to attack.

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BMD: FEASIBLE AND COMPARATIVELY CHEAP

Opponents of U.S. missile defense often argue that such systems are too expensive because an interceptor is more costly than the ballistic missile it seeks to destroy. This critique is akin to arguing that we should not buy bulletproof vests for our police because a bullet is much cheaper than the vest. Rather than comparing the cost of an interceptor to the price of an incoming rocket, we should be comparing the value of what an interceptor is protecting to the cost of an incoming missile.

Moreover, even if the cost argument were valid, missile defense is a disproportionately small part of the defense and federal budgets. The President's fiscal year 2016 budget request contains a little over \$8 billion for the Missile Defense Agency (MDA), and additional small missile defense funding is included in the individual military services' budgets. Considering how much damage a successful ballistic missile attack on the United States would cause, ballistic missile defense programs are a prudent investment.

Iron Dome gave Israeli leaders more time to make decisions that contributed to minimizing casualties and de-escalating the conflict. This should be a desired end-state for America as well.

The lesson of Iron Dome is that when a government puts its mind to it, missile defenses are possible. It is one that the United States should take to heart.

Here, a partisan divide remains. While there is a strong support in the House and Senate for Israel's air and missile defense program, the same is not the case for America's own defenses. For a host of mostly ideological reasons originating in the Cold War, U.S. missile defense is still viewed by many in a negative light.

That perception is beginning to change, albeit slowly. The National Missile Defense Act of 1999 made it national policy for the U.S. to protect itself from limited ballistic missile attack.⁷ Today, the word "limited" means about a handful of missiles. In the early 1990s, it was defined as 200 incoming warheads, because that is how many could be launched from a Soviet submarine.

These artificial limits are dangerous and obsolete. During the Cold War, U.S. leaders assumed that, in order for deterrence to work, it was necessary to give the Soviet Union's missiles a "free ride" to U.S. population centers and maintain our ability to strike back with a devastating response. The world today

is different, and the United States faces multiple unpredictable armed adversaries that may not be deterred by a massive retaliation because they may not care about their populations as the U.S. does.

MORE TIME TO DE-ESCALATE

In 2014, the Iron Dome gave Israeli leaders more time to make decisions that contributed to minimizing casualties and de-escalating the conflict. This should be a desired end-state for America as well. Amid a conflict, the President will need all the time available to take prudent measures. Missile defense has the potential to provide that time.

The Iron Dome, of course, is not a magic solution to the Israeli–Palestinian conflict. Nor is it a silver bullet against terrorism. But the lessons of the Israeli experience are clear. The United States would be foolish to ignore them. ■

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EVOLUTION AND ADAPTATION

IMPROVING MISSILE DEFENSE

PETER HUESSY

For thirty-three years, the United States and its allies have pursued the deployment of ballistic missile defenses in Europe, America and East Asia. From original arguments about the feasibility, cost and wisdom of building such defenses, the current debate has shifted to making the current systems we have operate better, increasing their number and lethality, integrating them with our other military systems, and ensuring that our allies and friends are part of a sensible overall ballistic missile defense architecture.

These four tasks—improve, integrate, innovate and internationalize—are central to the missile defense budget of \$8.2 billion submitted by the Administration to Congress in early February. However, the context is still a five-year ballistic missile defense plan that is some \$12 billion less than what the Administration originally submitted to Congress just a few years ago. This is so even though the threat from ballistic missiles has markedly increased.

Given that reality, Congress will have to examine the budget to make sure current BMD technologies have added as much innovation as possible to expand their capability. This will give us more “bang for the buck.” Similarly, Congress has to insure that—whatever their inventory—available missile defense interceptors have capable sensors and satellites with which to locate attacking missiles and guide our defenses to intercept such threats. And we have to take burden sharing seriously, bringing more of our allies into a ballistic defense network that protects not only the United States but our friends in NATO and Asia.

WHAT WE NEED

The Director of Intelligence and Security at the U.S. Strategic Command, Jeffrey Haworth, explained in recent remarks that our adversaries are building and deploying more missiles “of every range... capability... and category of threat,” while the inventory of U.S. and allied missile defenses is not keeping pace.¹

For example, while \$105.8 million is requested for Patriot modernization, that is less than was projected in last year’s budget request, and—when extended over the next five years—some \$200 million less than originally envisioned for the task. On the other hand, the Administration requested \$559 million for procurement of Aegis ballistic missile defenses, including 40 additional SM-3 Block 1B missiles that when bought will be deployed on our Navy cruisers and destroyers. But the total is still below the amount needed to fully outfit the fleet of new Aegis ships with a ballistic missile defense capability.

Critical to these defenses are better radars, sensors and satellites. The budget requests \$138 million (compared to \$79.5 in FY15) for a Long Range Discrimination Radar (LRDR), but Congressional sentiment is to also seek additional technologies as the TYP-2 radar and more LRDR systems to deploy in Alaska, near the East Coast of the United States, as well as in Europe, the Middle East, and Asia. These are all needed to improve discrimination capabilities that can distinguish warheads from decoys, as well as track incoming warheads and provide what is known as persistent coverage of U.S. territory.

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One of the most important initiatives in the budget request is continued work to build a next generation kill vehicle (\$279 million) to go atop the missile interceptors now deployed in silos in California and Alaska. These 30 interceptors will grow to 44, but the original kill vehicle is largely a prototype, made largely by hand, and has worked in just 60% of all tests. The country needs to improve this performance and provide our commanders better communications, improve the shot doctrine capability, and generally allow the system to be more easily produced and more reliable.

Admiral James Syring, director of the Pentagon's Missile Defense Agency, has made acquiring a new kill vehicle (KV) incorporating the latest technology one of his top priorities. Congress shares this view, and will probably seek to determine carefully whether the funding request is adequate over the five-year defense plan, not just in today's budget.

Related is that the ground-based interceptors on our West Coast are needed on our East Coast as well, in order to allow the United States to have multiple intercept opportunities against a ballistic missile launch from the Middle East, for example, that is aimed at the continental United States. In the budget are funds for an environmental impact study for such a site, which may be done by the end of 2015—at which time there should follow a recommendation of where we should deploy the new defense.

POLITICAL WRINKLES

Politics play a role in these considerations. An agreement to limit the Iranian nuclear program—especially if ratified by Congress—might have the effect of undermining support for such an additional protective shield. Opponents of missile defense might argue that without nuclear weapons there is only a very limited threat from Iranian long-range ballistic missiles. Conversely, however, one might argue that in the absence of an Iranian nuclear weapons program, why would Iran be allowed to continue its long range ballistic missile programs if

there is no warhead to be mounted on top of their missiles?

Related to this, of course, is that the original SM-3 Block IIB system—phase IV of the European Phased Adaptive Approach—was designed by this administration to originally deal with long range Iranian missile threats. But that system was subsequently cancelled by this administration. This came on top of the earlier, 2009 cancellation of the original Czech Republic and Polish sites housing a combined two-stage ground based interceptor and radar and designed to protect Europe and the U.S. from long-range Iranian missiles.

Related to this protection of the continental United States is the Aegis ashore system, which uses the SM-3 missile in the Block1B phase II of the European Phased Adaptive Approach to protect Europe. The Aegis missile has been successful in 28 of 34 tests to date, and is scheduled to equip 30 Aegis Navy ships now and for an expanded fleet of 43 ships by FY2019. However, to allow these ships to perform a multitude of functions, including air and missile defense simultaneously, significant upgrades are required and Congress will pay special attention to that part of the budget request.

There is an absence of funding for new technologies such as directed energy, rail guns, and space-based defenses, all of which have the potential to give the U.S. a strategic advantage in dealing with increasingly sophisticated ballistic missile threats.

MORE WORK TO BE DONE

Three key military commanders have identified three additional missile defense areas of concern:

First, for example, Brigadier General Christopher Spillman explains that better networking is required to deal with the current gaps in U.S. air and missile defense systems, even as a wide variety of missile threats are evolving across the globe.

Second, Major General Ole Knudson similarly says we have to *integrate* such systems as the THAAD (the terminal high altitude air defense) into our overall integrated air and missile defense systems. Here the specific issue of whether the THAAD system will be deployed in the Republic of Korea comes to the forefront as the ROK government is concerned that Chinese (PRC) opposition to such missile defenses may have deleterious economic impacts on Seoul if the US goes forward with the deployment.

Third, Rear Admiral Jesse Wilson says that the United States is beginning to focus again on concepts such as “left of launch,” which entails pre-emptively taking out the missile launch complex of an adversary prior to the actual launch of such threatening missiles. This might not only include what historically was known as “counter-battery fire,” but also cyber attack, jamming and laser attacks that could prevent the launch of hostile missiles at the U.S. and its allies. Such technologies and capabilities need to be better *integrated* into U.S. and allied air and missile defense plans because Congress will focus there as well.

In short, the missile technology of our adversaries is growing in terms of capability, capacity, quantity and quality.

Of particular Congressional concern is a requirement missile defense supporters are pursuing that would, in the words of Rebecca Heinrichs of the Hudson Institute, have the United States “Shift from a policy of only deploying BMD against certain kinds of limited threats vs. defending against most plausible threats irrespective of their nature.”² This in turn reveals one of the “holes” in the Administration’s budget request: the absence of funding for new technologies such as directed energy, rail guns, and space-based defenses, all of which have the potential to give the U.S. a strategic advantage in dealing with increasingly sophisticated ballistic missile threats.

This is not an “over the horizon” threat which we can wait to address. As the Commander of the

Space and Missile Defense Command, Lieutenant General David Mann, has noted, 22 countries have an offensive ballistic missile capability and nine, or nearly half, of those have a nuclear capability.³ In short, the missile technology of our adversaries is growing in terms of capability, capacity, quantity and quality. In just the week after the February 16, 2015 release of our defense budget proposal, Pakistan tested a new nuclear capable *Ra’ad* missile; Iran launched a satellite into space; Russia tested its new RS-126 missile; the DPRK tested five anti-ship missiles, and; China rolled out a new version of its land-based ICBM.

WORK IN PROGRESS

The response of the West and NATO contains both good news and bad news. In a welcome development, Poland is boosting its defense spending by \$42 billion over ten years, in part to buy a “missile shield” and anti-aircraft systems, combat drones, armored personnel carriers and submarines.⁴ This, however, is counterbalanced at least in part by the fact that Turkey may or may not purchase a Chinese missile defense capability, and may or may not integrate its missile defenses into those of NATO.

Seoul, for its part, has proven reluctant to deploy the THAAD missile defense in South Korea for fear of offending the Chinese government. But Israel is not, and is moving to both improve the capability of its Arrow missile defense system and to develop a new “Naval Iron Dome (C-Dome)” to protect Israel energy facilities at sea.

There is other good news. Israel’s Iron Dome will be improved to shoot down UAVs and counter mortars. The Kingdom of Saudi Arabia and Qatar will both order the THAAD missile defense—but it may take three years to finalize the contracts. Other countries in the Middle East, meanwhile, are stepping up to buy the U.S. Patriot missile defense technology. As for Japan, it is co-developing the SM-3 Block IIA missile interceptor with the United States and will subsequently have a total of eight Aegis class destroyers with such a capability. We are also

building a second X-band radar for Japan, (despite PRC objections), even as Japan seeks to artfully move around its constitutional cap of spending only 1% of its GDP on defense.

⁴ Christopher Harres, “Next Door to Russia, Poland Boosts Defense Spending By \$42 Billion Over Ten Years.” *International Business Times*, February 16, 2015, Accessed May 26, 2015, <http://www.ibtimes.com/next-door-russia-poland-boosts-defense-spending-42-billion-over-ten-years-1818068>.

THE ROAD AHEAD

The United States has undeniably made progress. We have—or will have—some 1,700 missile defense interceptors of various capabilities by the end of this fiscal year. This compares with an inventory of zero in the year 2000, the last year of the Clinton administration and a time when the U.S. was a party to the straitjacket of the ABM treaty. Though, as our combatant commanders have asserted, this is still inadequate, there can be little doubt that the United States and its allies have moved the issue of missile defense forward significantly, and in the process strengthened American and allied diplomacy. What still remains to be done is a better integration of our missile defense systems into our air and missile defense framework, even as we innovate existing technologies and move to greater cooperation with our international partners.

We have much to do and a missile defense budget many tens of billions below what is required to meet the emerging and growing threat. It is time Congress found the wherewithal to move the missile defense budget in the right direction to better “provide for the common defense.” ■

ENDNOTES

¹ Sydney Greenberg, “Army Explores New Missile Defense Options,” *Breaking Defense*, February 18, 2015, Accessed May 26, 2015, <http://breakingdefense.com/2015/02/army-explores-new-missile-defense-options/>.

² Rebecca Heinrichs, “Staying Ahead of the Threat: Improvements Needed for U.S. Missile Defense,” *George C. Marshall Institute Policy Outlook*, p. 11, February 2015, accessed May 26, 2015, <http://marshall.org/wp-content/uploads/2015/02/Staying-Ahead-of-the-Threat-Heinrichs-Final-Final-02192015.pdf>.

³ J.D. Leipold, “Army Air, Missile Defense Strategy Updates Needed for Force 2025,” *ARMY.MIL*, The Official Homepage of the United States Army, February 12, 2015. Accessed May 26, 2015. http://www.army.mil/article/142829/Army_Air_Missile_Defense_Strategy_updates_needed_for_force_2025/.

THE FUTURE OF MISSILE DEFENSE

TECHNOLOGY AND NEW CONCEPTS OF OPERATION

WILLIAM SCHNEIDER

In the quarter century that has elapsed since the end of the Cold War, the increasing threat to both deployed forces and civil infrastructure from modern ballistic and cruise missiles has made missile defense an integral component of U.S. defense policy. The growth of the missile threat has been magnified by the redistribution of power following the collapse of the Soviet Union in 1991, and by the global diffusion of modern technology.

Today, some of the poorest nations on earth—North Korea and Pakistan, for example—are able to develop, field, and operate modern ballistic missiles armed with nuclear weapons in significant numbers. China and Russia have, in turn, significantly increased the role of long-range missiles and nuclear weapons in their respective national security policies. For example, Russia's new military doctrine, published in December 2014, enhances the role of nuclear weapons, especially theater nuclear weapons, in the management of the escalation process in future conflicts.

The strategic missile modernization programs of China and Russia are advanced, and moving forward with significant momentum. China has turned from its Cold War posture of "minimum deterrence" (which entailed two dozen fixed-site liquid-fueled ICBMs) to a modern land and sea-based mobile missile force equipped with accurate multiple warhead missiles with modern nuclear weapons. Russia is in the process of recapitalizing its entire legacy Cold War nuclear posture—a project that is scheduled to be completed by the end of the current New START treaty in 2021. (By contrast, the modernization and recapitalization

of the U.S. Cold War military force will not be completed until 2040, or later.)

Russia, moreover, is working to increase the total number of warheads fielded by significantly increasing the number of warheads mounted on each ballistic missile. It is also seeking to evolve its missile warhead re-entry vehicles to fly a hypersonic non-ballistic trajectory, thereby evading ballistic missile defenses. In tandem, both China and Russia have adopted an increasingly adversarial posture with respect to the U.S. and its regional allies in Europe and East Asia. The cumulative effect of these developments has been to stimulate the forces driving nuclear proliferation.

PRESSURE TO PROLIFERATE

An unwelcome and unexpected development of the post-Cold War era has been the intensity and durability of nuclear proliferation. North Korea has conducted three nuclear tests to date, based on technology derived indigenously as well as through assistance from Pakistan. Pakistan's program was, in turn, facilitated by nuclear weapons design information from China.

Both North Korea and Iran were able to advance their nuclear weapons development programs through a "diplomatic fog" of negotiations over the past three decades. North Korea was able to prolong negotiations under the 1994 "Agreed Framework" negotiated by the Clinton administration, and to do so long enough to complete its weapon design work and covertly divert fissile material from its "civil" nuclear energy program. North Korea subsequently withdrew from the 1968 Nuclear Nonproliferation Treaty (NPT).

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Iran's nuclear program, meanwhile, has advanced significantly during the years of multilateral negotiations between Tehran and the West. Under the Joint Plan of Action launched in November 2013 and subsequently codified understandings, Iran will be permitted to produce International Atomic Energy Agency (IAEA)-monitored low-enriched uranium and one kilogram of plutonium per year—sufficient to assure that at least one year would be required before nuclear weapons “break-out” could occur. Yet the effectiveness of this arrangement depends on the capabilities of the IAEA to monitor Iran's compliance with the agreement, something that is far from assured.

The movement of North Korea and Iran toward the acquisition of nuclear weapons or “threshold” nuclear status has proliferation consequences. Other nations (e.g., Saudi Arabia) whose security interests may be at risk should Iran produce nuclear weapons, are now seeking parallel “rights” under the de facto new terms of the NPT, which will permit the creation of nuclear weapon “threshold” states. Meanwhile, North Korea's ability to exploit the NPT to gain access to nuclear technology, divert that technology to produce nuclear weapons, and then renounce its status as a Treaty signatory bodes ill for international non-proliferation norms.

A less appreciated but potentially more important source of proliferation pressure are the consequences of the “vertical” proliferation in both China and Russia. This has manifested itself in new nuclear weapon designs, a more assertive doctrine of nuclear use, and the engineering of a capacity for a vast increase in the number of nuclear weapons that both countries will be able to field in a very brief period of time. Moreover, the increase in military capabilities on the part of Moscow and Beijing, the integration of their theater and strategic nuclear systems into new concepts of operation, and the manipulation of nuclear threats against non-nuclear states affect the perceptions and behavior of nations other than their “traditional” Cold War adversary—the United States.

While China's current capacity to pose a long-range ballistic missile threat to the U.S. is limited, the same cannot be said for the threat it poses to Japan. The Chinese threat to American territory will still take several years to mature, but Japan is today facing a threat from hundreds of missiles as part of intense diplomatic confrontation over sovereignty of the Ryuku Island chain, which China claims. Japan's BMD architecture is sized to cope with a modest North Korean threat, but not a large Chinese one.

The increase in military capabilities on the part of Moscow and Beijing, the integration of their theater and strategic nuclear systems into new concepts of operation, and the manipulation of nuclear threats against non-nuclear states affect the perceptions and behavior of nations other than their “traditional” Cold War adversary—the United States

Moreover, Russia's decision to significantly increase its nuclear weapons capabilities and renew its security collaboration with China has revived the Cold War nightmare of a powerful anti-U.S. Sino-Russian alliance. While the U.S. retains a powerful core nuclear deterrent, its post-Cold War abandonment of a forward nuclear presence in East Asia has proven to be unsettling and has raised anew issues concerning the credibility of the American extended deterrent.

THE EXTENDED DETERRENT

The core reinforcement for the international non-proliferation norms created by the NPT has been the credibility of the nuclear guarantee provided by the United States to allied and friendly nations. Advanced industrial nations with the scientific and technical capacity to produce modern nuclear weapons have long abstained from doing so because the U.S. nuclear capability was sufficient for their security needs.

But that state of affairs is increasingly in doubt. The U.S. decision to withdraw its forward theater nuclear

presence, first in 1992 when all U.S. theater nuclear weapons on aircraft and ships were withdrawn, and again in 2010 when the submarine-launched and nuclear armed *Tomahawk* missile was taken out of service, effectively decoupled the U.S. conventional military presence from its core nuclear deterrent. The bilateral U.S.-Russia New START treaty, signed in 2010, further challenged the credibility of the American extended deterrent, as the U.S. proclaimed its desire to eliminate all nuclear weapons. The bilateral context for of this aspiration has magnified the concern of nations threatened by regional players such as North Korea and the PRC in Northeast Asia, or by Iran in the Gulf region. This phenomenon has not gone unrecognized in the U.S., and extensive diplomatic efforts have been made to recover the diminished credibility of the extended deterrent. However, uncertainty about both U.S. capabilities and commitment remain.

Developments in modern military technology in the quarter century since the collapse of the Warsaw Pact offers a basis for optimism that there may be a viable way to recover the declining credibility of our extended nuclear deterrent.

RECOVERING CREDIBILITY

The reversal of post-Cold War expectations concerning the role of nuclear weapons poses a difficult dilemma for U.S. policymakers. The intensification of nuclear proliferation pressures, if unabated, will significantly increase the risk of nuclear use as proliferation spreads from U.S. adversaries to American allies.

Nevertheless, it is unlikely that the credibility of the extended deterrent can be recaptured through the recapitalization of the U.S. legacy nuclear weapons force structure. Though indispensable, simply replacing the Minuteman III ICBMs, the *Ohio*-class submarine-launched ballistic missile submarines, and the B-2 bomber and air-launched cruise missiles is likely to be seen to be insufficient by many U.S. allies. The scope of the problem of nuclear proliferation, and

the characteristics of Chinese and Russian nuclear weapons modernization, is such that it simply cannot be offset by a U.S. modernization of its nuclear forces.

Nevertheless, developments in modern military technology in the quarter century since the collapse of the Warsaw Pact offers a basis for optimism that there may be a viable way to recover the declining credibility of our extended nuclear deterrent. There are four key military capabilities that have emerged since the end of the Cold War:

- Integrated theater and strategic nuclear weapons and delivery systems;
- Cruise and ballistic missile defense;
- Cyber-operations; and
- Prompt conventional regional and global strike

During the Cold War, the extended deterrent was sustained by a well-thought out escalating sequence of military capabilities, beginning with conventional military forces, progressing to theater nuclear forces, and ultimately culminating in strategic nuclear forces. This concept of operations (CONOPS) was almost entirely linked to circumstances in Europe whereby NATO and Warsaw Pact forces faced each other on the Continent's Central Plains. Despite the extraordinary density of lethal equipment, the alliances were reciprocally deterred by the capabilities in place. These capabilities were both necessary and sufficient.

Today, the military power supported or reinforced by nuclear weapons today is far more dispersed. Moreover, the prowess of the U.S. and a handful of other nations able to raise and support a modern combined arms conventional military capability simply overwhelms the military power of most otherwise modern states. Indeed, the inability of many nations to field an effective conventional defense is an important incentive for the acquisition of nuclear weapons.

However, the U.S. has fielded important capabilities in the past quarter century that can augment the credibility of the extended deterrent:

Cruise and ballistic missile defense is the most visible and significant new development. The application of the technologies of persistent surveillance and hit-to-kill technology has markedly increased the effectiveness of BMD, while diminishing the confidence that a potential attacker can repose in likelihood that his ballistic missile attack will be successful. Moreover, new technologies are emerging that will increase the effectiveness of missile defense. Electromagnetic rail guns, for example, offer low-cost projectiles that will be highly effective against both cruise missiles and both endo and exo-atmospheric missile warheads. Further into the future (but not too far), directed energy systems, especially high energy laser systems based on high altitude unmanned aircraft, will be part of the BMD force structure. If these technologies can be successfully developed and fielded, they will offer a “deep magazine” form of defense that will invalidate conventional ballistic missile attack as a cost-effective proposition.

Cyber-operations offer opportunities to engage adversary forces to the “left of launch” to disrupt, divert, or prevent the firing of adversary weapon systems. This technology is relatively new, but is being used every day by a variety of nations, including both allies and adversaries. In addition to using cyber operations to insert lethal payloads into enemy cyber networks, the use of electronic warfare (controlling the radio frequency spectrum) is another effective method that can be deployed to disrupt or disable adversarial systems. As with other capabilities in the “cross domain” context discussed here, the integration of cyber operations into other dimensions of U.S.

military capability will further complicate the task of the attacker, and add greater depth to the deterrent.

Prompt conventional regional and global strike leverages short time-of-flight systems (high speed cruise missiles, ballistic missiles, and other hypersonic delivery vehicles) to defeat local air and missile defenses while exploiting persistent surveillance and delivery accuracy to further complicate the task of the attacker. Hence, the attacker’s missiles—whether in mobile transporter-erector-launchers (TELs) or in silo-based locations—will be vulnerable to conventional attack prior to launch.

The ability to leverage cross-domain capabilities against adversary nuclear forces provides a means of enhancing deterrence that was not available during the Cold War. But to exploit the rich potential of cross-domain deterrence, a modern nuclear command-and-control system will be required. The existing system in place today was shaped by the unique demands of the Cold War.

The complexity of integrating multiple capabilities simultaneously across domains is admittedly formidable. However, after more than a half-century of employing the military applications of modern information technology, doing so should be within the state-of-the art. It is a task that must be undertaken; recovering the credibility of the extended deterrent is the most significant step to be taken to sustain the hard-won non-proliferation norms of the 20th century into the 21st. ■

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