

# CSBA

Center for Strategic and Budgetary Assessments

# CRITICAL MASS

NUCLEAR PROLIFERATION IN THE MIDDLE EAST



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**CRITICAL MASS:  
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BY ANDREW F. KREPINEVICH

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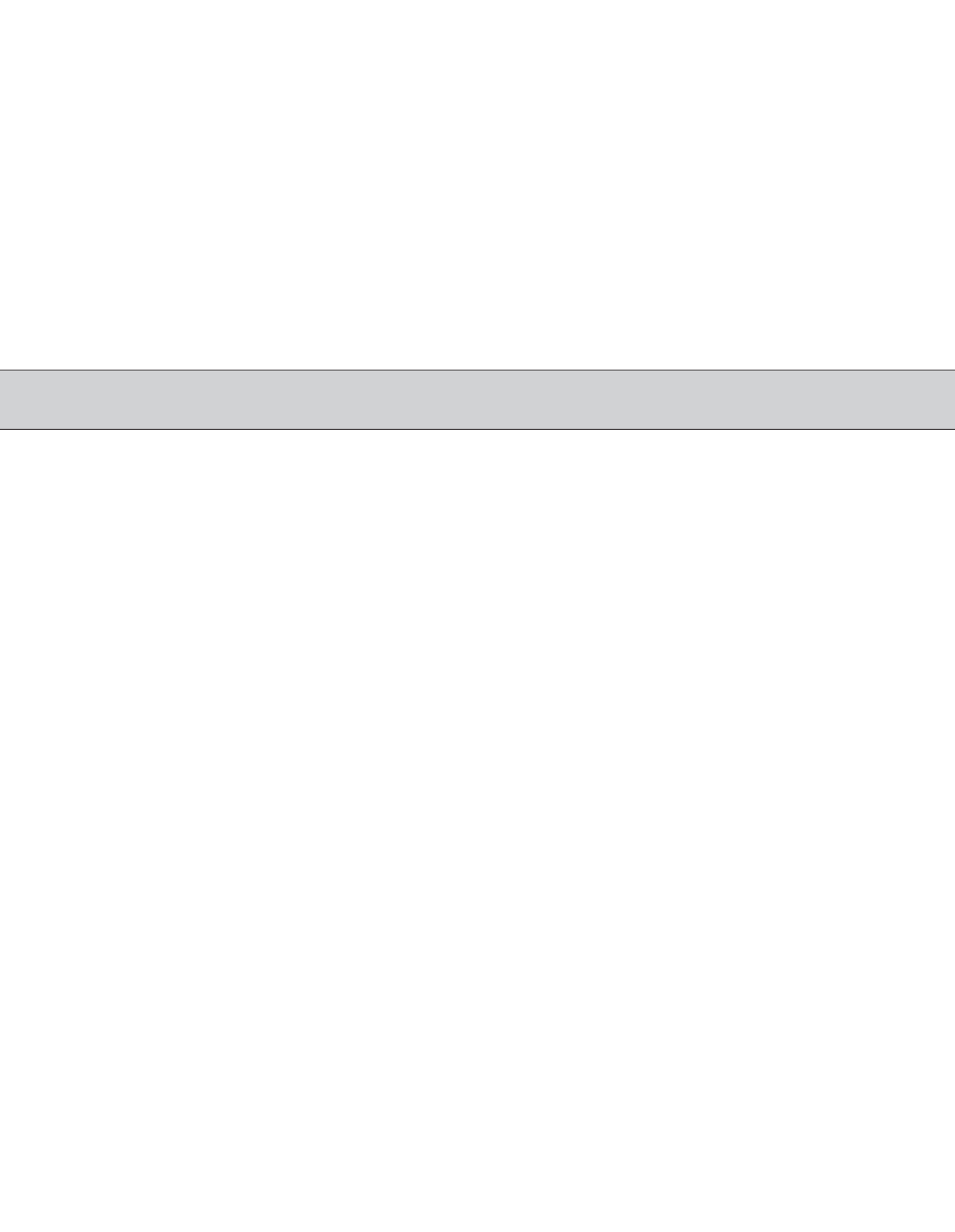
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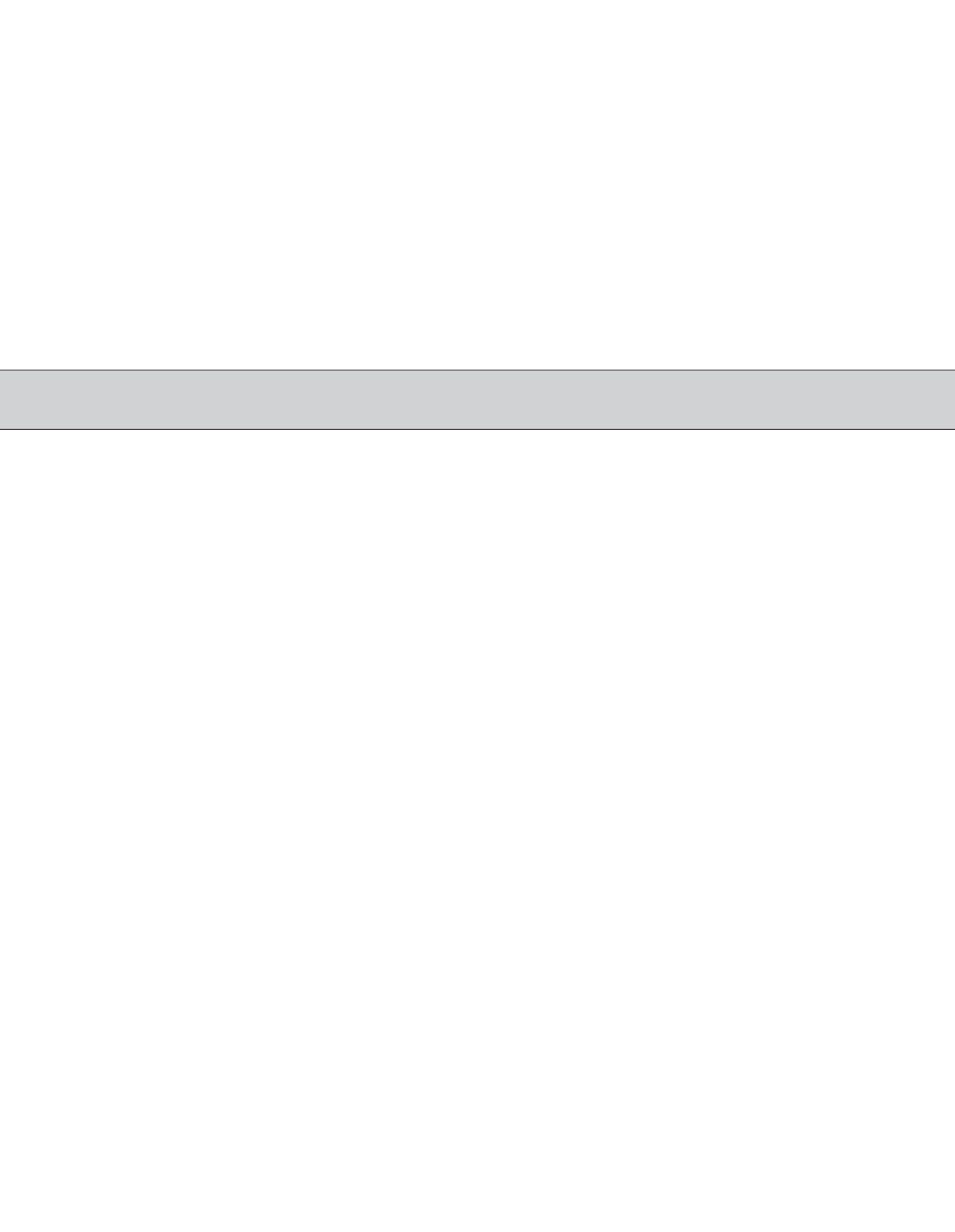
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## EXECUTIVE SUMMARY

This report provides a preliminary assessment of how an Iranian nuclear weapons capability could affect stability in the Middle East. In particular it explores the prospective characteristics of the region in the event Iran acquires a nuclear arsenal. It then examines the prospective effectiveness of deterrence as the core element of a strategy to preserve regional stability and preclude the use of nuclear weapons.

While current U.S. policy seeks to prevent Iran from acquiring a nuclear capability, history shows that such efforts are not always successful, and prudent planning dictates that policy-makers consider how stability might best be assured in a world in which Iran possesses a nuclear weapons capability. Toward that end, this report's baseline assumption is that Iran will acquire a nuclear weapons capability, initially resulting in a bipolar regional nuclear competition with Israel. It also assumes that the United States and Israel refrain from initiating a military response upon discovering Iran's nuclear capability. Thus the report's main focus is on assessing the challenges arising from a bipolar regional nuclear power structure, including a prospective proliferation "cascade" involving other states in the region. Finally it presents some thoughts on the dynamics of a multipolar nuclear competition in the Middle East and the potential for regional nuclear conflict.

In the event efforts to prevent the proliferation of nuclear weapons in the Middle East fail, U.S. policy would likely seek to maintain stability in the region as the best means of preventing war in general (and the use of nuclear weapons in particular), and of preserving access to the region's energy resources that are crucial to global economic growth. During the Cold War U.S. efforts to maintain stability were rooted in a strategy that relied heavily on deterrence, which included extended deterrence. Some argue that a similar approach would offer the best prospect of preserving the peace in a proliferated Middle East. This report challenges that assumption.



Among this reports key findings are the following:

- Access to formerly classified documents and statements from former U.S. and Soviet senior officials suggests that deterrence between the two Cold War superpowers was nowhere near as robust as some believed, particularly during periods of heightened tensions.
- Contrary to the prevailing wisdom in some quarters that Cold War models of deterrence will apply, a Middle East in which two hostile competitor powers—in this case, Iran and Israel—have nuclear weapons may be highly unstable.
- In part, this instability will stem from each side’s lack of insight into how its competitor calculates cost, benefit, and risk, leaving the door open for miscalculation.
- Regardless, there exists a structural instability owing to the exceedingly short missile flight times between states in the region and the costs (both financial and technical) of fielding, maintaining, and operating effective early warning and command and control systems.
- Missile defenses are unlikely to prove cost-effective in this environment. Nuclear-armed states can attack with large numbers of ballistic missiles, only a handful of which are nuclear-armed, while the defense is compelled to attempt to intercept them all. To the extent missile defenses are being deployed to the region during a crisis, they may increase the prospects of nuclear use by creating a “use-it-or-lose it” situation in the mind of the enemy.
- Crisis instability may be heightened further due to the prospect that a third party might seek to trigger a catalytic war between two other states. For example, firing ballistic or cruise missiles at one nuclear-armed state would be interpreted as an attack by its nuclear rival. Using cyber weapons to introduce false information into an early warning system may also be a means of triggering a catalytic war.

- Should Iran acquire a nuclear capability, intense pressure among some other states in the region to pursue nuclear weapons will likely emerge. If the region is host to a “Shi’a/Persian” bomb and a “Jewish/Israeli” bomb, then pride and honor, to say nothing of security, may “require” a “Turkish” bomb and a “Sunni Arab” bomb. The result would almost certainly be a ratcheting up of regional instability. A nuclear proliferation cascade could occur relatively quickly if the nuclear non-proliferation regime were to collapse following Iran fielding a nuclear capability.
- Powers external to the region will likely seek to influence the competition, engaging in a “Nuclear Great Game” with the aim of improving their standing with key regional powers by offering access to key technologies and capabilities that could greatly compromise regional stability in an already highly turbulent environment.

Preventing a proliferated Middle East may be beyond the capabilities of the United States or the international community. However, given the consequences that would likely follow, all options for preventing this outcome should be thoroughly explored. At the same time, a hedging strategy should be crafted in the event efforts to prevent proliferation fail. This strategy should have the goal of enabling the United States and the international community to maximize the prospects of preserving both regional stability and the tradition of non-use of nuclear weapons that has existed since 1945. Toward this end, a rich menu of plausible scenarios should be examined to identify ways in which deterrence in a proliferated Middle East might fail and, correspondingly, possible options to strengthen the barriers to nuclear use.



## INTRODUCTION

This report provides a preliminary assessment of how an Iranian nuclear weapons capability could affect stability in the Middle East. In particular it explores the prospective characteristics of the region in the event two or more states acquire nuclear arsenals. It then examines the prospective effectiveness of deterrence as the core element of a strategy to preserve regional stability and preclude the use of nuclear weapons.

While current U.S. policy seeks to prevent Iran from acquiring a nuclear capability, history shows that such efforts are not always successful, and prudent planning dictates that policy-makers consider how stability might best be assured in a world in which Iran becomes a nuclear power. Toward that end, this report's baseline assumption is that Iran will acquire a nuclear weapons capability, initially resulting in a bipolar regional nuclear competition with Israel. It also assumes that the United States and Israel refrain from initiating a military response upon discovering Iran has crossed the nuclear threshold. Thus the report's main focus is on assessing the challenges arising from a bipolar regional nuclear power structure, including a prospective proliferation "cascade" involving other states in the region. Finally it presents some thoughts on the dynamics of a multipolar nuclear competition in the Middle East and the potential for regional nuclear conflict.

This report will also explore the prospective value of relying on a variation of the U.S. Cold War strategy of avoiding nuclear war by relying on deterrence, including extended deterrence. It will examine some issues that arise in the event of an "n-state," or multipolar, competition that could result in the event that a proliferation cascade follows Iran's fielding a nuclear arsenal. Relatively new capabilities—precision-guided weaponry, cyber weapons, and advanced missile defenses—that promise to exert a significant influence on the nuclear balance will be examined as well as the mature nuclear powers' willingness to provide material and technical assistance to proliferant states in the Middle East.

Four chapters comprise this report. Chapter 1 assesses the prospects for relying on a deterrence-based strategy to address the challenge posed by an Iran armed with nuclear weapons. Chapter 2 discusses the factors that could shape Iran's and Israel's nuclear postures and efforts to secure their nuclear forces against a disarming attack. Chapter 3 offers a vision of a "Nuclear Great Game" in the Middle East, assessing the ability of the United States and other external powers to influence regional nuclear competitions. Chapter 4 describes the key characteristics of a proliferated Middle East, including identifying scenarios that could lead to nuclear use. The report ends with a brief conclusion.

## CHAPTER 1: IRAN, ISRAEL, AND THE DETERRENCE CHALLENGE

This chapter describes a plausible path that Iran could follow to acquire a nuclear weapons capability while avoiding Israeli or U.S. military action designed to block it from doing so. It then proceeds to make the case that if efforts to prevent Iran from acquiring a nuclear capability fail, relying on deterrence as the principal element of a strategy to preventing the use of nuclear weapons may prove a forlorn hope. Specifically, it argues that relying on classic deterrence strategies as some have advocated should Iran acquire nuclear weapons could be far more problematic, costly and dangerous than historical deterrence relationships in other regions.

In particular, there is a lack of understanding both as to how prospective nuclear-armed states in the region calculate cost, benefit, and risk with regard to nuclear weapons use, and how they communicate (and their rivals understand) their nuclear “red lines.”<sup>1</sup> There are also several key structural factors to be considered, each of which will likely work to undermine efforts at deterrence: geography, speed of nuclear weapon delivery, and the limits of defenses and attack warning. The chapter closes by considering the effect that advances in military technology, to include cyber weapons and precision-guided munitions (PGMs) might have on the prospects for avoiding nuclear use.

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<sup>1</sup> The general problem of policy-makers’ inability to perceive the world and their rivals accurately is addressed in Robert Jervis, *Perception and Misperception in International Politics* (Princeton, NJ: Princeton University Press, 1976).

## An Iranian Path to a Nuclear Capability

This assessment assumes that Iran will follow some form of “breakout” path, moving from a latent nuclear capability, to an undeclared nuclear weapons capability, and finally to a declared capability. In particular, a “buildup-and-breakout” path—the strategy of accumulating fissile material, developing delivery systems, and then clandestinely building a small arsenal of nuclear weapons—could appeal to a regime seeking to cloak its true intentions and capabilities and maximize its diplomatic maneuverability. Only after amassing an arsenal that Iran felt it could protect from a preemptive strike would Iran openly proclaim itself to be a nuclear power. This arsenal could comprise as few as several, or up to a dozen, nuclear weapons. As both India and Pakistan demonstrated in 1998, it is possible to amass a small but significant nuclear arsenal before declaring a nuclear weapons capability.<sup>2</sup>

If during this process Tehran were confronted with the direct threat of military force against its nuclear infrastructure, it might adopt the North Korean model of testing an initial nuclear device and then negotiating with the international community so as to achieve the same end result as a buildup-and-breakout strategy. This “Pyongyang Gambit” would emulate North Korea’s strategy of offering to negotiate over its nuclear arsenal as a means of buying time to improve and expand it.<sup>3</sup>

Iran has no doubt observed the North Korean nuclear strategy and witnessed its relative success. Indeed, there are signs that Iran may be emulating it. In 2006 Hassan Rouhani, Iran’s newly elected president and former chief nuclear negotiator, declared that Iran was trying to “do a North Korea”—that is, follow a covert nuclear path and then present the world with a *fait accompli*.<sup>4</sup>

If Iran’s buildup-and-breakout strategy were compromised after it had achieved a nuclear capability but before it had built sufficient weapons to make an attack on its nuclear forces a risky proposition, Tehran could continue pursuing the DPRK’s diplomatic strategy of continuing negotiations. One possible scenario is that Iran could announce its willingness to accept international supervision of its nuclear program if certain demands regarding Israel are met. These demands might include Israel returning to its pre-June 1967 borders, agreeing to refugee right-of-return, accepting international supervision of its nuclear program and accession to the Nuclear Non-proliferation Treaty (NPT), and/or assenting to the creation of a Middle East Nuclear-Weapons-Free Zone (NWFZ) or Weapons of Mass Destruction Free Zone (WMDFZ), as called for in the Final Action Plan of the 2010 NPT Review Conference. Even those Arab and Islamic states that oppose Iran’s nuclear ambitions might be induced to support Tehran’s efforts to cham-

Iran has no doubt observed the North Korean nuclear strategy and witnessed its relative success.

<sup>2</sup> Of course, if Israel openly declared its nuclear arsenal, it would provide yet another example.

<sup>3</sup> Avner Cohen, “Israel Ponders a Nuclear Iran,” *Bulletin of Atomic Scientists*, August 17, 2010, available at: <http://thebulletin.org/israel-ponders-nuclear-iran>.

<sup>4</sup> Milani, *The Myth of the Great Satan: A New Look at America’s Relations with Iran* (Stanford, CA: Hoover Institute Press, 2010), p. 99.

pion their cause against Tel Aviv. China and Russia might encourage such talks, with an eye toward solidifying their influence with Iran while undermining Israel.<sup>5</sup>

The Pyongyang Gambit would also play on the proclivities of the leading Western democracies and Middle East states looking to avoid making the hard choices they would face if confronted with a nuclear-armed Iran. Negotiations would enable the leaders of these states to argue that because Iran's program might be undone, they can defer confronting its reality. The Pyongyang Gambit, particularly if it raises the prospect of a Middle East NWFZ, also challenges the Western Powers to make good on their commitments under the NPT to move toward a world without nuclear weapons. Should momentum for a regional NWFZ build, Israel would face a formidable diplomatic trap, and the United States might be hard pressed to garner support for a confrontational stance toward Iran from the other permanent members of the UN Security Council.

U.S. policymakers know all too well how the Pyongyang Gambit ended: North Korea weathered the sanctions imposed upon it and pocketed the concessions it received while pressing ahead with its nuclear weapons program. The same scenario may be playing out with respect to Iran. The United States and its EU-3 partners continue to combine a mix of diplomatic initiatives with economic sanctions while Iran makes progress on uranium enrichment. What is the strategy for addressing a prospective Iranian version of the Pyongyang Gambit? Whatever course is chosen, prudence dictates that the United States hedge against the prospect that political initiatives and economic sanctions will fail to arrest Tehran's march toward a nuclear capability and that the world will have to deal with the consequences.<sup>6</sup>

If Iran succeeded in fielding a nuclear weapons capability, there would be a corresponding decline in the prospective utility of U.S. conventional forces in theater contingencies. Those forces have been the backbone of U.S. security commitments to regional partners for decades. Instead, the focus of military competition could shift toward a greater emphasis on sub-conventional or irregular warfare. Here Iran enjoys a significant advantage, having provided extensive support to insurgents and

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<sup>5</sup> Yehezkel Dror, *Political Statecraft for Israel: Memorandum for Policymakers* (Ramat Gan, Israel: Begin Sadat Center for Strategic Studies, Bar Ilan University, June 2009).

<sup>6</sup> U.S. policymakers cannot discount the possibility that Israel could undertake a preventive attack against Iran's nascent nuclear capability. Israeli deliberations over a preventive strike against Iran before Tehran develops a nuclear weapons capability have been widely discussed in the open source literature. Although this report assumes otherwise, there remains a possibility that Israel will act alone against Iran's infant nuclear capability. The particular escalation dynamics that could lead to such an attack will be discussed below in the section on the Iranian-Israeli nuclear balance. It is important to note that Israel has a long tradition of acting preemptively and with considerable success. The one crisis situation in which Israel could have acted first and did not, the 1973 Yom Kippur War, resulted in near-disastrous consequences for the state of Israel. It was also the only Arab-Israeli War in which U.S. nuclear forces went on high alert. See Jeffrey Goldberg, "The Point of No Return," *The Atlantic Monthly*, September 2010; and Dima Adamsky, *The Culture of Military Innovation: The Impact of Cultural Factors on the Revolution in Military Affairs in Russia, the US, and Israel* (Stanford: Stanford University Press, 2010), pp. 111-113.



terrorist organizations in Iraq, Afghanistan, Lebanon, and Yemen over the past three decades to challenge the United States, Israel, and several Arab states.<sup>7</sup> Iran historically has made extensive use of proxies and asymmetric warfare to attack U.S. interests throughout the Middle East. For example, the Qods Force of Iran's Islamic Revolutionary Guards Corps was involved with or provided support for some of the most lethal terrorist attacks in recent history, including the 1983 Beirut embassy bombing and the 1996 Khobar Towers bombing in Saudi Arabia.<sup>8</sup>

### **Deterrence: The Gap Between Perception and Reality**

There is a temptation to extend the thinking about deterrence that dominated the U.S.-Soviet nuclear competition during the Cold War into the current environment. However, there are strong reasons to believe such thinking may be dangerously misapplied in the context of a proliferated Middle East. The circumstances characterizing a Middle East with two or more nuclear powers are likely to differ greatly from those that characterized the Cold War-era superpower rivalry. Furthermore, some of the conventional wisdom regarding the effectiveness of deterrence during the Cold War has proven to be mistaken in the wake of revelations from declassified documents and accounts from former Soviet officials. Thus, new thinking may be needed about how deterrence might work—or fail to work—in a proliferated Middle East.

Deterrence depends on effectively communicating a threat to either deny an adversary the ability to accomplish a proscribed action, or to make the adversary's perceived costs of achieving the proscribed action exceed its anticipated gains. In the case of a nuclear-armed Iran, the Middle East would be confronted, at least in the short term, with a bipolar competition between Tehran and Tel Aviv, as well as the prospect of major powers external to the region becoming involved. Preventing nuclear weapons use by relying principally on a strategy of deterrence would require a level of understanding on the part of both the Israeli and the Iranian leadership regarding how each rival calculates cost, benefit, and risk, as well as how to communicate their nuclear "red lines" in a way their rival will both understand and find credible. While the world has had some forty-odd years to gain a sense of the conditions under which Israel might employ nuclear weapons, no such experience exists with respect to Iran. In Israel's case, since acquiring a nuclear weapons capability it has refrained from employing nuclear weapons despite being engaged in periodic wars with its neighbors, to include the 1973 "Yom Kippur" War with Egypt and Syria in which it initially suffered severe setbacks. From these experiences one can assert that Israeli military doctrine reserves nuclear

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<sup>7</sup> Milani, *The Myth of the Great Satan*, p. 92.

<sup>8</sup> U.S. Department of Defense, *Unclassified Report on Military Power of Iran* (Washington, DC: Government Printing Office, 2010), pp. 7-8; and Milani, *The Myth of the Great Satan*, p. 93.

weapons employment for the most extreme circumstances, such as when its very existence hangs in the balance. Of course, Israel's nuclear doctrine was formed during a period when it enjoyed a nuclear monopoly in the region. It is thus fair to ask if this employment strategy would change in the face of a nuclear-armed Iran.

The answer to this question may depend a great deal on the nuclear posture Iran assumes, among other factors. Yet little is known regarding the circumstances under which Iran's leaders would employ nuclear weapons. Given Tehran's public declarations that its nuclear program is for peaceful purposes only, any official discussion of what kind of nuclear arsenal it might seek and its corresponding nuclear doctrine would severely undermine its position. For better or worse, then, Iran remains close to a blank slate when it comes to discerning how it would posture or use its nuclear weapons if and when it acquires such a capability. In the absence of an understanding of the doctrine, posture, and decision-making of a nuclear-armed Iran, there may be a tendency to employ Cold War concepts regarding deterrence and its prospective effectiveness out of ignorance, misplaced hope, or both.

This would be a mistake. A number of Cold War assessments of the U.S.-Soviet nuclear balance assumed that the opposing sides would act rationally, roughly along the lines suggested by game theory, despite considerable evidence to the contrary. These assessments persisted even though the historical record shows that the conditions assumed in game theory (i.e., that both sides had full knowledge of the circumstances; that they both calculated the payoffs from their decision options similarly; and that their decisions would be executed as they intended) rarely, if ever, held in reality.<sup>9</sup>

Moreover, the U.S.-Soviet nuclear competition was characterized by circumstances highly favorable to deterrence. Both countries were among the world's largest. Their heartlands were geographically separated by thousands of miles. Both were among the world's biggest and most technically advanced economies, enabling them to invest enormous resources in survivable nuclear forces, early warning, and sophisticated command-and-control systems. Both maintained strong civilian control over their militaries. Many of these favorable conditions will not characterize an Iranian-Israeli nuclear competition.

Yet some senior officials not only appear to believe that such behavior characterized the Cold War's nuclear superpower rivals, but that Israel and Iran (and the United States as well) can be counted on to follow suit. For example, consider the assertion of Hubert Vedrine, France's Foreign Minister from 1997 to 2002, with regard to a nuclear-armed Iran:

**For better or worse, Iran remains close to a blank slate when it comes to discerning how it would posture or use its nuclear weapons if and when it acquires such a capability.**

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<sup>9</sup> For a detailed treatment of this issue, see Keith B. Payne, *The Fallacies of Cold War Deterrence and a New Direction* (Lexington, KY: University of Kentucky Press, 2001).

Jacques Chirac said things that many experts are saying around the world, even in the United States. That is to say, that a country that possesses the bomb does not use it and automatically enters the system of deterrence and doesn't take absurd risks.<sup>10</sup>

Vedrine is not alone. Others have argued that the United States and Israel can effectively deter Iran from employing nuclear weapons by drawing clear “red lines” around proscribed actions.<sup>11</sup> But this logic also discounts other problems associated with maintaining deterrence. Individual leaders, particularly in periods of crisis when they are under intense and prolonged stress, may be prone to miscalculation, dramatic shifts in behavior, or psychological breakdown. Their calculations may also be skewed by faulty intelligence. Second, decision-makers can become victims of a failure (or inability) to exert positive control over organizations under their command. Third, factors relating to technology may drive even those leaders who wish to avoid war to pursue war. Geography, especially when rivals are in close proximity to each other, can exert significant influence on the prospects for effective deterrence. Finally, the emergence of new technologies may act to undermine as well as enhance deterrence. The following sections illustrate some of the challenges to pursuing an effective deterrence strategy.

### **The Limits of Human Rational Behavior**

Deterrence relies in no small part on an understanding of how the target of deterrence calculates cost, benefit, and risk. Often there is an underlying assumption by Actor A, who is attempting to practice deterrence, that the object of his efforts, Actor B, is “rational” in the sense that he behaves “rationally;” i.e., that he calculates cost, benefit, and risk in ways similar and familiar to Actor A. Yet the history of the last century is replete with examples of leaders taking what were considered by many as “absurd risks,” or “irrational” acts.

For example, in the period leading up to World War II, the allies, Great Britain and France, failed to act when the German dictator Adolf Hitler successfully occupied the Rhineland, Austria, and Czechoslovakia. Given their feckless behavior in the face of his earlier acts of aggression, when Great Britain and France realized this and offered security guarantees to Poland, Hitler discounted this “red line” and invaded Poland in September 1939.<sup>12</sup> Once again assumptions regarding how an adversary calculated cost, benefit, and risk proved wrong, with enormous consequences for the world.

**Deterrence relies in no small part on an understanding of how the target of deterrence calculates cost, benefit, and risk.**

<sup>10</sup> Elaine Sciolino, “Chirac’s Iran Gaffe Reveals a Strategy: Containment,” *New York Times*, February 3, 2007, p. A8.

<sup>11</sup> See, for example, James M. Lindsay and Ray Takeyh “After Iran Gets the Bomb. Containment and Its Complications.” *Foreign Affairs*, March-April 2010, pp. 33-49.

<sup>12</sup> Alan Bullock, *Hitler and Stalin* (New York: Alfred A. Knopf, 1992), p. 631.

There are many other examples of the gaps that emerge from differences in how rivals see the world, and the consequences thereof for deterrence. During the months leading up to the 1991 Gulf War, the U.S.-led coalition of states gave Iraqi dictator Saddam Hussein numerous opportunities to back down in the face of overwhelming force. He refused to do so and suffered one of the most devastating defeats in the history of warfare. Yet, despite this experience, twelve years later when he again confronted a U.S.-led coalition whose military capabilities vastly exceeded his own, Hussein again refused to comply with U.S. demands. While his refusal was viewed by many in the United States and elsewhere as “irrational,” in retrospect it appears Hussein’s calculations were based on a very different perspective of the situation than that of senior U.S. policy-makers. According to Major General Wafic al Sammarai, former head of Iraqi military intelligence, “Saddam [before the 1991 Gulf War] thought any reprisals would be limited and would tail off with time. He thought that America’s involvement in Vietnam had badly damaged its willingness to use military power.”<sup>13</sup>

Saddam also relied too heavily on the lessons he took from Iraq’s recent war with Iran. He grossly underestimated American military capabilities and, in particular, did not accurately gauge the strength of U.S. ground forces. He apparently believed Iraq’s military could fight an extended war of position against coalition forces along Iraq’s borders in 1991, as he had in his war with Iran in the 1980s. He seemed to believe that, if Iraqi forces could carry out such an operation and inflict substantial casualties on the Americans, then the United States would abandon its efforts as it had in the Vietnam War.<sup>14</sup> If Saddam in fact viewed the situation in this manner, then while his actions may have appeared irrational to the Americans, they were quite rational from his point of view. That said, Saddam also appears to have been far more risk-tolerant than most Western leaders. His personality was likely more akin to Hitler’s. As one lifelong associate of Saddam observed, “He cannot survive without war . . . [he] said that war is glory.”<sup>15</sup> Simply put, even on the eve of the Second Gulf War in 2003 Saddam Hussein severely miscalculated

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<sup>13</sup> Quoted in “Frontline: The Gulf War,” *Frontline* Show #1407T, PBS, Air Date: January 28, 1997, available at [http://www.pbs.org/wgbh/pages/frontline/gulf/script\\_a.html](http://www.pbs.org/wgbh/pages/frontline/gulf/script_a.html).

<sup>14</sup> On Saddam’s pre-war strategic calculations, see Michael A. Palmer, *Guardians of the Gulf: A History of America’s Expanding Role in the Persian Gulf, 1833-1992* (New York: Free Press, 1992), pp. 160-162.

<sup>15</sup> Tim Trevan, *Saddam’s Secrets* (New York: Harper Collins, 1999), p. 300. Cited in Payne, *The Fallacies of Cold War Deterrence and a New Direction*, p. 42.

U.S. willingness and ability to wage war.<sup>16</sup> Can one reasonably assume that such miscalculations will be avoided in a Middle East with two or more nuclear-armed states and that a “system of deterrence” will prevail?

Perhaps the greatest miscalculation of a rival during the nuclear age occurred in the late summer and early fall of 1962. The Soviet Union began covertly shipping nuclear missiles to Cuba, despite public warnings from the United States not to introduce offensive weaponry into that island.<sup>17</sup> When U.S. intelligence discovered the operation in October, President John Kennedy imposed a blockade of Cuba and demanded that Moscow withdraw its weapons.

On at least one occasion during the Cuban Missile Crisis, Cuban dictator Fidel Castro urged his Soviet counterpart, Nikita Khrushchev, to attack the United States with nuclear weapons if U.S. conventional forces attacked Cuba, even though Cuba was certain to be obliterated in a U.S. nuclear counterstrike. Castro’s behavior may have appeared suicidal; however, according to those who knew him, Castro:

had the messianic ambition of a man selected by history for a “unique mission” one who valued national *dignidad* (“dignity, or “honor”) *above survival*. While Kennedy and Khrushchev were sobered by the prospect of a nuclear conflict, a Cuban newspaper editor who observed Castro during his early days in power felt that “Fidel gets his kicks from war and high tension.” [Emphasis added]<sup>18</sup>

Simply put, if Castro had wielded control of the nuclear weapons on his territory, he was prepared to use them.

The Americans were totally surprised by Khrushchev’s gambit. Even as the Soviet deployment was underway a CIA National Intelligence Estimate (NIE) concluded “the establishment on Cuban soil of Soviet nuclear striking forces which could be used against the U.S. would be incompatible with Soviet pol-

<sup>16</sup> Among his other miscalculations in 2003, Saddam Hussein apparently believed the United States would not go to war without the sanction of the United Nations and was confident both France and Russia would use their veto to defeat any resolution supporting military action against Iraq. He also appeared to believe that the United States and United Kingdom lacked the will to wage war absent a clear provocation by Iraq, perhaps drawing on events such as the U.S. withdrawal from Somalia following the killing of a handful of U.S. troops in the fall of 1993, Washington’s reluctance to respond forcefully to the Khobar Towers bombing in 1996, and the bombing of U.S. embassies in Africa in 1998. Kevin M. Woods, with Michael R. Pease, Mark E. Stout, Williamson Murray and James G. Lacy, *A View of Operation Iraqi Freedom from Saddam’s Senior Leadership* (U.S. Joint Forces Command Center for Joint Operational Analysis, n.d.), pp. 28-31.

<sup>17</sup> On September 4, 1962 President Kennedy issued a statement, declaring, “There is no evidence of any organized combat force in Cuba from any Soviet bloc country; of military bases provided to Russia; of a violation of the 1934 treaty relating to Guantanamo; of the presence of offensive ground-to-ground missiles; or of other significant offensive capability either in Cuban hands or under Soviet direction and guidance. Were it to be otherwise, the gravest issues would arise.” U.S., Department of State, *Bulletin*, Volume XLVII, No. 1213, September 24, 1962, p. 450.

<sup>18</sup> Michael Dobbs, *One Minute to Midnight* (New York: Alfred A. Knopf, 2008), pp. 76, 103.

icy as we presently estimate it.” Thus, by attempting to deploy nuclear weapons covertly into Cuba, Khrushchev undertook a reckless act from the American perspective. Yet expecting the mercurial Soviet leader who, according to a close colleague, had “enough emotion for ten people—at least” to respect U.S. warnings against deploying Soviet offensive weapons in Cuba seemed to reflect a mistaken belief that Khrushchev was as risk averse as his American counterpart. For his part Kennedy concluded his rival acted outside the bounds of acceptable (and *anticipated*) diplomatic behavior, like “an immoral gangster . . . not a statesman, not as a person with a sense of responsibility.” In other words, Kennedy viewed Khrushchev as a person who would take absurd risks. Kennedy also began questioning himself—his own credibility—and whether Khrushchev really understood him either, and concluded the Soviet leader thought, “I’m inexperienced. Probably thinks I’m stupid. Maybe most important, he thinks that I had no guts.”<sup>19</sup>

As the crisis went on both leaders and their advisors were subjected to intense stress, which also influenced how they interpreted the information they were receiving and how they calculated the relative value and risks associated with alternative courses of action, to include military action and the use of nuclear weapons. Khrushchev’s calculus of how the United States would respond to his provocative act varied widely during the crisis. When Kennedy ordered U.S. forces to DEFCON-2,<sup>20</sup> a Soviet deputy foreign minister told colleagues that Khrushchev was terrified. Yet at another point during the crisis Khrushchev confidently declared, “The Americans have chickened out. It seems that Kennedy went to sleep with a wooden knife.... They say that when someone goes bear

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<sup>19</sup> Dobbs, *One Minute to Midnight*, pp. 7, 33, 123. Andrei Gromyko, the Soviet foreign minister, is the close colleague who remarked on Khrushchev’s personality. Kennedy’s initial response to the situation shows how temporal factors can greatly influence decision-making. Similarly, although President Kennedy eventually negotiated the withdrawal of Soviet missiles, his initial inclination was “We’re going to take out those missiles” (Dobbs, *One Minute to Midnight*, p. 8). There is some merit in Kennedy’s observation. During the short period of his presidency to date, Kennedy had given the go-ahead to the Bay of Pigs invasion in April 1961, and then failed to follow through once the U.S.-supported Cuban fighters floundered in the face of Castro’s troops. Khrushchev was unimpressed by Kennedy when the two met a month later for a summit in Vienna. When the Soviets began constructing the Berlin Wall three months later, Kennedy did not respond forcefully. Thus one can understand how Khrushchev might not take Kennedy’s warnings regarding placing offensive weapons in Cuba seriously. On the low esteem in which Kennedy’s leadership was held by Khrushchev, see Richard Reeves, *President Kennedy* (New York; Simon & Schuster, 1993), pp. 166, 170; and Michael Beschloss, *The Crisis Years* (New York: Edward Burlingame Books, 1991), pp. 228, 382-84.

<sup>20</sup> A defense readiness condition (DEFCON) is an alert posture used by the United States armed forces, ranging from peacetime readiness (DEFCON-5) to general war (DEFCON-1). The first and only time U.S. forces were raised to DEFCON-2 was during the Cuban Missile Crisis. U.S. forces have been called to DEFCON-3 on only two occasions; during the 1973 Yom Kippur War and during the September 2001 terrorist attacks on New York and Washington. Joint Chiefs of Staff, *Joint Publication 1-02, Department of Defense Dictionary of Military and Associated Terms* (Washington, DC: US Joint Chiefs of Staff, November 8, 2010), as amended through December 31, 2010, p. 100.

hunting for the first time, he takes a wooden knife with him, so it is easier to clean his pants.”<sup>21</sup>

This earthy commentary suggests that Khrushchev’s calculation of costs, benefits, and risks was erratic, changing dramatically over the course of the crisis.

Mao Zedong also proved willing to take what the leaders of Western nuclear powers would likely view as reckless chances. Indeed, he proved to be a leader whose risk tolerance surpassed Khrushchev’s, and even Castro’s. Seeing China’s large population as a source of advantage, Mao famously observed, “If Imperialism imposes a war on us, we have 600 million people, and if we lose 300 million of them, what of it?”<sup>22</sup> While this might be dismissed as public posturing, in one of his private correspondences with Khrushchev, Mao declared that China was prepared to fight a nuclear war with the United States, stating, “For our ultimate victory, for the total eradication of the imperialists, we are willing to endure the first [U.S. nuclear] strike. All it is is a big pile of people dying.”<sup>23</sup>

One searches in vain for a similar statement by a U.S., British, or French statesman. Clearly Mao’s approach to calculating the costs, benefits, and risks associated with nuclear war were considerably, if not radically, different from those of Cold War-era U.S. presidents.

Mao was willing to risk the lives of many Chinese, even when the stakes were far lower. For instance, on October 27, 1966, Mao ordered a Chinese ballistic missile armed with a live nuclear warhead to be tested by firing it 500 miles across northwest China. In the course of its flight the missile passed over several relatively heavily populated areas.<sup>24</sup> Was Mao reckless? Certainly by Western standards he was. But given Mao’s objective of “devaluing” the U.S. nuclear advantage over China, what better way to convince Washington that he was prepared to risk nuclear war than to fire a nuclear-armed missile over his own people? Thus this act was arguably quite rational given Mao’s

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<sup>21</sup> Khrushchev’s point was that first-time bear hunters were more afraid of the bear than the bear was of them. Thus upon seeing a bear, they would soil their pants, which could be more easily “cleaned” with a dull wooden, as opposed to a sharp metal, knife. Dobbs, *One Minute to Midnight*, p. 112.

<sup>22</sup> *Memoirs of Nikita Khrushchev*, Vol. 3, Nikita Sergeevich Khrushchev, ed. (University Park, PA: Penn State University Press, 2013), p. 436.

<sup>23</sup> Jung Chang and Jon Halliday, *Mao* (New York: Alfred A. Knopf, 2005), p. 414.

<sup>24</sup> Gordon Barrass, *The Great Cold War: A Journey Through the Hall of Mirrors* (Stanford Security Studies, First Edition, January 29, 2009), p. 117. Mao’s callousness toward the Chinese people is well-documented. Examples can be found in the millions who died in an attempt to achieve his goals in the Great Leap Forward as well as those who perished during his “Cultural Revolution.” See Jasper Becker, *Hungry Ghosts* (New York: The Free Press, 1997); and Jung Chang and Jon Halliday, *Mao*, pp. 414, 565-66.

strategic framework.<sup>25</sup>

Factors other than misperception and stress can impair how senior decision-makers calculate cost, benefit, and risk. Consider the situation during the early 1980s in the Soviet Union. For a time the country was led by Konstantin Chernenko, a man of advanced age and in a state of declining health.<sup>26</sup> Anatoly Chernyaev, Deputy Director of the International Department in the Central Committee, recalled that at meetings “Chernenko couldn’t even read the notes anymore, but just stumbled through them with no idea what he was saying.”<sup>27</sup> Yet on Chernenko’s shoulders rested the decision as to whether to unleash the massive Soviet nuclear arsenal during the 1983 war scare with the United States, which will be discussed presently.

The way in which deterrence is pursued may differ dramatically depending upon the decision-maker one is trying to influence. Two years after the Cuban Missile Crisis, Khrushchev was removed from power, in part because of fears over his propensity for “harebrained scheming.”<sup>28</sup> He was succeeded by Leonid Brezhnev, a man far more risk averse than his predecessor. In 1972, even after the Soviet

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<sup>25</sup> There are other examples of the perceptual divide between a leader of a communist Asian state and the leader of a Western democratic state. In early 1965 President Lyndon Johnson was looking for a way to avoid the United States becoming heavily involved in the war between North and South Vietnam. In an attempt to induce North Vietnam’s leader, Ho Chi Minh, to negotiate a settlement on equitable terms, Johnson gave a speech at Johns Hopkins University in which he offered to finance a major economic development plan along the Mekong River if Ho “would only be reasonable.” On the way back to the White House the president said to an aide, “Old Ho can’t turn that down.” As Bill Moyers, one of Johnson’s closest aides remarked, “You see, if Ho had been George Meany, he would have had a deal.” WGBH Media Archives, Interview with Bill D. Moyers, May 5, 1981, available at: <http://openvault.wgbh.org/catalog/vietnam-369379-interview-with-bill-d-moyers-1981>. At the risk of stating the obvious, Johnson assumed that his Vietnamese rival calculated costs, benefits, and risks along the lines of one of his domestic political rivals, union leader George Meany. During the Vietnam War, U.S. leaders thought that a “slow squeeze” of increasing military pressure against North Vietnam would ultimately find Hanoi coming to terms. U.S. calculations of how North Vietnamese leaders calculated costs and benefits, however, once again proved erroneous, and the war dragged on to a U.S. defeat. For their part, the North Vietnamese leaders may have been surprised by the arrival of over half a million U.S. troops in South Vietnam following President Lyndon Johnson’s statement in October 1964 that, “We are not about to send American boys nine or ten thousand miles away from home to do what Asian boys ought to be doing for themselves.” Quoted in Stanley Karnow, *Vietnam: A History* (New York: Penguin, 1986), p. 395. In each instance one side misjudged the likely responses of the opponent, and such misjudgments can certainly affect the success of a strategy based on nuclear deterrence. At the time George Meany was head of the powerful AFL-CIO labor union, a frequent visitor to the power centers in Washington, and, like Lyndon Johnson, an old hand at cutting deals involving compromise. It bears noting that President Johnson had far more experience in domestic political matters than in foreign affairs and was more comfortable (and successful) in dealing with individuals in that environment. Thus viewing Ho Chi Minh within the same framework of U.S. domestic politics allowed the president to remain in his “comfort zone” where he had enjoyed considerable success in past negotiations.

<sup>26</sup> Chernenko’s time as general secretary of the Soviet Union spanned barely two years.

<sup>27</sup> David E. Hoffman, *The Dead Hand* (New York: Anchor Books, 2009), p. 145.

<sup>28</sup> Beschloss, *The Crisis Years*, p. 699.



Union was approaching strategic parity in the balance of nuclear forces with the United States, Brezhnev was extremely cautious participating in a General Staff exercise in order to better understand his duties when in the event of a surprise attack by U.S. nuclear forces. Brezhnev was briefed that 80 million people would be killed in the U.S. attack, with 85 percent of the U.S.S.R.'s industry destroyed and the European part of the Soviet Union rendered uninhabitable by radiation. An observer recalled "Brezhnev and [Soviet Premier Alexi] Kosygin were visibly terrified by what they heard." When Brezhnev was invited to push the button that would launch the "retaliatory strike" (in reality some unarmed missiles) he turned pale, and began perspiring and trembling. He repeatedly asked, "Is this definitely an exercise?"<sup>29</sup> In brief, in Khrushchev and Brezhnev the Soviet Union had two leaders whose cost, benefit, and risk calculations seemed inconsistent with their nuclear position relative to the United States.

To sum up, senior decision-makers have held dramatically different views on how their rivals calculate the costs, benefits, and risks of a particular course of action. This suggests that a strategy based on deterrence to address the challenge posed by a nuclear-armed Iran may not be as robust as some observers appear to believe.<sup>30</sup>

### **The Limits of Institutions and Intelligence**

Institutions, particularly intelligence organizations, at times provide faulty information to senior decision-makers that can induce misperceptions regarding an adversary's intentions, with all the attendant consequences for efforts to enforce a strategy of deterrence. During the latter stages of the U.S.-Soviet struggle Washington attempted to fortify deterrence against a Soviet nuclear attack by according high priority to targeting the Soviet leadership in an American retaliatory strike. The objective was to convince the Kremlin leaders that their very lives would be at risk should they order an attack. Rather than strengthening deterrence, however, the move was viewed in Moscow as an indication the United States was planning

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<sup>29</sup> Barrass, *The Great Cold War: A Journey Through the Hall of Mirrors*, p. 179; and David E. Hoffman, *The Dead Hand*, p. 20. The original source for this story is Hines' interview with Danilevich. See John G. Hines, Ellis M. Mishulovich, and John F. Shull, *Soviet Intentions 1965-1985, Vol. II, Soviet Post-Cold War Testimonial Evidence* (McLean, VA: BDM Federal, September 22, 1993), p. 27.

<sup>30</sup> While it is beyond the scope of this assessment, recent path-breaking research in the social sciences suggests that there may be fundamental cultural differences with respect to how people calculate cost, benefit, and risk. See Joseph Henrich, Steven J. Heine, and Ara Norenzayan, "The Weirdest People in the World," *Behavioral and Brain Sciences*, May 2010, pp. 61-83. See also Hazel R. Markus and Shinobu Kitayama, "Culture and the Self: Implications for Cognition, Emotion and Motivation," *Psychology Review*, Volume 98, Issue 2, pp. 224-53; and Richard E. Nisbitt, Kaiping Peng, Incheol Choi, and Ara NorenZayan, "Culture and Systems of Thought: Holistic vs. Analytical Cognition," unpublished paper, n.d. available at: <http://www-personal.umich.edu/%7Enisbett/images/cultureThought.pdf>. A version of this paper appears in *Psychological Review*, 2001, pp. 291-310.

a decapitation strike against the Soviet leadership as part of a first strike. Instead of tensions being reduced and deterrence enhanced, the opposite occurred. Under an operation code-named RYAN initiated in 1981, Soviet intelligence agents overseas were directed to look for evidence that the United States was planning a first strike. Perhaps not surprisingly, the Soviet agents sought out evidence to confirm their superiors' fears, even though most KGB operatives believed the chances of war remained low.<sup>31</sup> Based on the impact of RYAN, a genuine war scare erupted in the USSR after the September 1983 KAL Flight 007 incident and NATO's Able Archer 83 nuclear-release exercise in November.<sup>32</sup>

Fortunately war was averted, but the underlying problem did not escape the notice of the British Prime Minister Margaret Thatcher who concluded that, "We had entered a dangerous phase"<sup>33</sup> in the competition between the Soviet Union and the West. She realized that in order for deterrence to work, "What we in the West had to do was to learn as much as we could about the people and the system that confronted us, and then have as much contact with those living under that system as was compatible with our own continued security."<sup>34</sup> In brief, if deterrence was to work and war be averted, NATO needed to know as much as possible about how the Soviet leadership perceived the West's actions, and how the Kremlin calculated cost, benefit, and risk. Yet one suspects very little is known—or perhaps can be known—regarding how Iran's leaders think about the roles a nuclear arsenal would play in supporting their geopolitical ambitions, or how they view Israel's nuclear posture.

In summary, history suggests that, given the stakes involved when it comes to nuclear weapons, one should not assume that national leaders will avoid taking what their rivals perceive as "absurd risks," that is to say, that they will view the world and calculate costs, benefits, and risks similarly to the way their rivals do, or that they will be immune from mental, emotional, or physical flaws that limit their ability to act "rationally," or that the institutions providing them with intelligence or analytic support will always prove accurate in their estimates. Given recent Middle East history in general, and cultural differences between Israel and Iran in particular, there is sufficient evidence to make U.S. and Israeli leaders wary of making assumptions regarding how the Iranian leadership will respond to efforts designed to maintain stability and avert nuclear use.

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<sup>31</sup> Hoffman, *The Dead Hand*, pp. 70-71.

<sup>32</sup> Korean Air Lines Flight 007 was shot down by a Soviet fighter aircraft on September 1, 1983, after wandering into Soviet airspace, killing all 269 passengers and crew. On Operation RYAN and the 1983 Soviet War Scare, see Benjamin B. Fischer, *A Cold War Conundrum: The 1983 Soviet War Scare* (Center for the Study of Intelligence, The Central Intelligence Agency, March 19, 2007), available at: <https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/books-and-monographs/a-cold-war-conundrum/source.htm>.

<sup>33</sup> Hoffman, *The Dead Hand*, p. 88.

<sup>34</sup> Ibid.

**An Iranian-Israeli nuclear competition may well create its own dynamic quite different from the Cold War experience.**

That being said, if Iran acquires a significant nuclear capability, it could achieve Tehran's apparent goal of making the United States and Israel tread with far greater caution in the region. This could have the effect of greatly reducing the danger of the United States or Israel undertaking a direct attack on Iranian territory. Correspondingly a nuclear-armed Iran might feel far less constrained in its efforts to advance its interests in the region. How might this play out? The Cold War experience of two scorpions in a bottle<sup>35</sup> suggests that both sides would engage in an indirect competition through the use of proxies, much as Washington and Moscow did, in an effort to avoid a direct confrontation. Yet as described above, despite their efforts, the two superpowers did on several occasions come uncomfortably close to employing nuclear weapons.

Of course, an Iranian-Israeli nuclear competition may well create its own dynamic quite different from the Cold War experience or M. Veldrin's hopeful prediction. The following section presents several factors that suggest the countries inhabiting a proliferated Middle East may travel a different and even more dangerous path than that followed by the Cold War superpowers.

### **Geography, Speed, Accuracy and Early Warning**

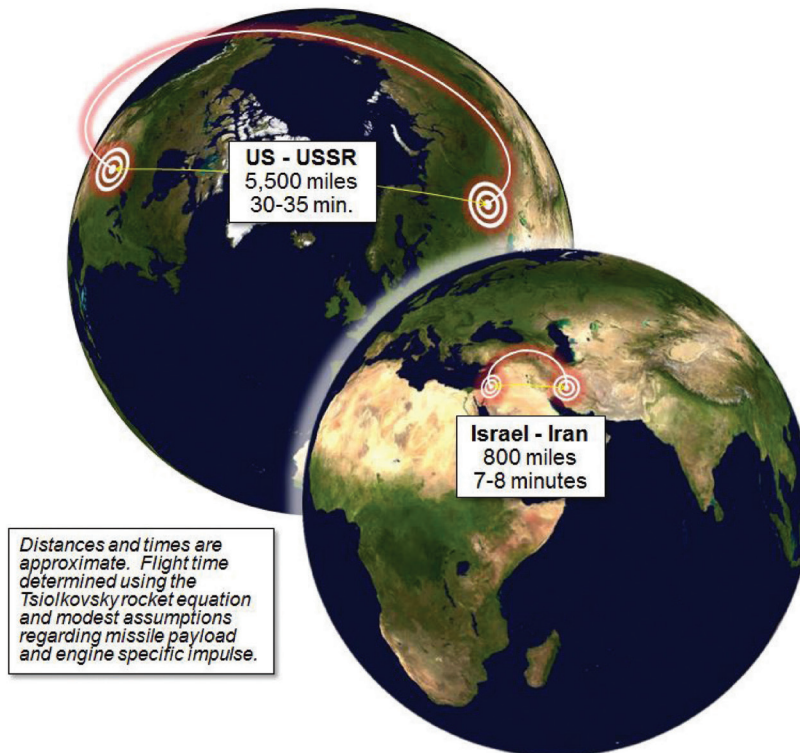
Even if the leaders of nuclear-armed states are generally risk-averse and pursue a nuclear posture based on deterrence, other factors may undermine their efforts to avoid nuclear use. In examining the situation between Israel and a nuclear-armed Iran, several interrelated factors in addition to the problem of understanding adversary perceptions identified above suggest that it may be difficult for either state to pursue a strategy rooted in deterrence, especially during a crisis. The first factor is geography. The second is rooted in technical and temporal limits, and concerns the difficulty both countries will likely face in attempting to maintain sufficient early warning and command and control systems to maintain an assured destruction capability and with it, deterrence. The third factor centers on the challenge senior decision-makers often experience in attempting to maintain control of events during a crisis to avoid become the victim rather than the master.

### **Geography and Speed**

The relative geographic positions of Iran and Israel are very different from that of the United States and the Soviet Union during the Cold War in three important ways. First, the distance between Israel and Iran is far shorter than

<sup>35</sup> The scorpion metaphor comes from a statement by J. Robert Oppenheimer, the physicist acclaimed as the "father" of the atomic bomb. In referring to the two nuclear-armed superpowers, he remarked, "We may be likened to two scorpions in a bottle, each capable of killing the other, but only at the risk of his own life." Richard Rhodes, *Dark Sun* (New York: Simon & Schuster, 1995), p. 567.

**FIGURE 1.** COMPARISON OF COLD WAR AND MIDDLE EAST MISSILE FLIGHT TIMES



was the distance between the United States and the Soviet Union. Owing to the speed at which ballistic missiles travel, both sides' attack warning times would be compressed from the twenty to thirty minutes or so that existed between the two superpowers to perhaps a little as five to six minutes, placing enormous strain on the Iranian and Israeli early warning and command and control systems.

Second, both Iran and Israel are far smaller than the two late-twentieth century superpowers—and Israel is far smaller still than Iran.<sup>36</sup> Thus some of the nuclear force posture options that the Cold War superpowers contemplated to establish survivable nuclear forces, such as mobile missile basing schemes absorbing large

<sup>36</sup> Israel covers roughly 8,500 square miles; Iran spans about 636,000 square miles. This makes Israel a little more than one percent the size of Iran.<sup>36</sup> The United States encompasses roughly 3.8 million square miles, while the U.S.S.R. extended over 8.65 million square miles.

land areas, are more difficult for a country like Iran (and far more difficult for Israel) to undertake on a significant scale.<sup>37</sup>

Israel's lack of strategic depth presents it with crucial vulnerabilities in any prospective nuclear competition with Iran. In terms of a nuclear strike, Israel has been described as a "one-bomb" country. While this may be an overstatement, a few nuclear detonations over cities like Tel Aviv and Haifa would have catastrophic consequences. Of course, in the event of such an attack Iran could count on being subjected to a devastating Israeli nuclear counterstrike. Thus Iran in principle would be deterred from initiating a nuclear conflict. Again, however, it is not clear how Iran's leaders would view nuclear weapons use.<sup>38</sup>

Third, with the exception of Canada, a close ally of the United States, there were no countries along the most direct route of nuclear attack over the North Pole. In the case of Israel and Iran, the most direct strike routes run through states inhabited by either Arabs or Turks, neither of whom are allies or terribly friendly toward either state. Thus relying on an airborne deterrent (i.e., strike aircraft) becomes problematic unless the two rivals are willing to violate the air space of neutral parties. Such violations could trigger a wider war or, in the event of a proliferated Middle East, incite a catalytic war. (The latter issue will be discussed presently.) Moreover, an airborne deterrent tied to major air bases would also be an attractive target for preemptive missile attack.

### Early Warning and Command and Control

Given the comparatively short distance between Israel and Iran, the attack response timelines may be so compressed that it is physically impossible for senior decision-makers to make an informed decision on an adequate (let alone optimal) response. This of course *assumes that both Israel and Iran have advanced early warning and command-and-control systems in place.*

A major dilemma for U.S. and Soviet leaders during the Cold War was how to maintain tight control over their nuclear weapons while still enabling them to be employed promptly before they could be destroyed in a surprise attack. A cursory review of both U.S. and Soviet efforts reveals that their attempts to resolve this dilemma at times put them perilously close to risking either an unintended or unauthorized use of nuclear weapons.

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<sup>37</sup> Both countries might consider hiding solid-fuel missiles on transporter erector launchers (TELEs) in underground shelters, but to employ them following a first strike, either country would require an operational command and control system and the ability to move the missiles above-ground. A seaborne nuclear force might represent a better deterrent.

<sup>38</sup> For example, former Iranian president Hashemi Rafsanjani, argued that, "one nuclear bomb inside Israel will destroy everything, [but] it will only harm the Islamic world. It is not irrational to contemplate such an eventuality." Thomas C. Reed and Danny B. Stillman, *The Nuclear Express* (Minneapolis, MN: Zenith Press, 2009), p. 298.

## The United States

In the case of the United States, concerns regarding a major buildup of Soviet nuclear forces in the 1950s led to the development of a network of early warning radars and command and control links known as the Distant Early Warning Line, or DEW Line, which became operational in 1958. The DEW Line stretched from Alaska across Canada and Greenland, ending in Iceland. It was supported by a large force of fighter-interceptor aircraft whose mission was to engage Soviet nuclear-armed bombers in the event of an attack. The DEW Line was later supplemented with the Ballistic Missile Early Warning System (BMEWS) designed to warn of a Soviet missile attack.

While these systems improved its early warning capability, the United States explored other options to ensure that its manned bomber force would be able to retaliate in the event of a nuclear attack. During the late 1950s, Air Force doctrine called for nuclear-armed bombers to take off upon receiving warning of a Soviet attack and head for predetermined targets in the Soviet Union. Unless they received a specific recall order over radio before reaching a certain point in their flight, the bombers were to proceed all the way to their targets and destroy them. To test its doctrine, in the fall of 1957, Strategic Air Command (SAC) conducted a test called FRESH APPROACH. Its purpose was to simulate the recall of a nuclear-armed bomber airborne alert force by radio. The plan called for the bombers to take off upon warning of a Soviet attack. They were ordered to proceed to their targets unless recalled prior to reaching a certain point in their flight. Ten aircraft participated in the exercise. Of the ten, one experienced radio failure and thus did not receive the recall message, while another failed to monitor the transmission as directed. The remaining eight aircraft did not receive the message on high-frequency (HF) radios. They did receive the recall command on ultra-high frequency (UHF) receivers, but only after they had struck their simulated targets. The famed strategist Albert Wohlstetter, who was a consultant to the Strategic Air Command at the time, told SAC's commanders that, "There aren't any good ways of starting World War III, but that would surely be one of the worst."<sup>39</sup>

Other attempts were made to fortify deterrence by ensuring the Soviets could not conduct a disarming first strike, and convincing them that this was the case. Toward this end, in the early 1960s the United States forward-deployed nuclear weapons in the territory of some NATO allies while retaining nominal custody. For example, at one base, four German Luftwaffe F-84F aircraft were on five-minute alert status, with fully armed Mk 7 A-bombs hung under the belly of each aircraft. The only evidence of U.S. custody was a single soldier armed with a rifle, which suggests a weakening of the U.S. political leadership's positive control

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<sup>39</sup> Henry S. Rowan, "Commentary: How He Worked," in *Nuclear Heuristics: Selected Writings of Robert and Roberta Wohlstetter*, Robert Zarate and Henry Sokolski, eds. (Carlisle, PA: Strategic Studies Institute, January 2009), pp. 104-05.

over the use of the weapons.<sup>40</sup> (If the Soviet leadership had been aware of this fact, one wonders if their principal reaction would have been that a successful disarming Soviet first strike was not possible, or that too many fingers were on NATO's nuclear trigger.) A decade later, upon appearing for duty as an officer at a U.S. Nike Hercules missile site, the author of this paper was surprised to find that it was possible to launch nuclear-tipped interceptors with nothing more than the cooperation of a handful of men under his command.<sup>41</sup> The problem of balancing nuclear weapons security with the need to have a nuclear force that can respond promptly against the risk of an unauthorized launch of a nuclear weapon (or weapons) would persist throughout the Cold War. This problem might present itself to Israel if it is faced with a nuclear-armed Iran; it would certainly be confronted in Tehran.

These two nuclear scorpions would also need to avoid false attack warnings that could trigger "accidental" use. This problem manifested itself on several occasions during the Cold War. For example, on the morning of November 9, 1979, the displays at four U.S. command centers simultaneously indicated a full-scale Soviet missile attack on the United States was under way. During the next six minutes emergency preparations for a U.S. retaliatory strike were made. Air Force bombers were launched, including the president's National Emergency Airborne Command Post.<sup>42</sup> Although a direct "hot line" had been installed between the White House and the Kremlin after the Cuban Missile Crisis to effect prompt communications in the event of an emergency, no attempt was made to use the hot line to ascertain Soviet intentions or to explain the rationale behind what the Soviets would almost certainly view as provocative U.S. actions.

Fortuitously, the U.S. North American Aerospace Defense Command (NORAD) was able to access the BMEWS PAVE PAWS radar's early warning data, as well as data from early warning satellites. NORAD determined that no Soviet missiles had actually been launched. The culprit turned out to be a computer exercise tape running on the system. The tape had been loaded but the system had not been switched to "test" mode.<sup>43</sup> While it took only six minutes to detect the problem, six minutes is roughly all the time that an Israeli (or Iranian) leader would have before missiles launched by the other would arrive at their intended targets.

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<sup>40</sup> Reed and Stillman, *The Nuclear Express*, p. 141.

<sup>41</sup> Substantial improvements in nuclear weapons security have been made since that time. Today U.S. nuclear weapons are protected by permissive action links, or PALs. Today's PALs are sophisticated electromechanical devices that require a twelve-digit code be inserted. The mechanism has a "limited try" feature that permits only a few attempts to enter the correct code before the weapon refuses to activate. Reed and Stillman, *The Nuclear Express*, p. 142.

<sup>42</sup> Time, however, precluded the president from being aboard.

<sup>43</sup> Scott D. Sagan, *The Limits of Safety* (Princeton, NJ: Princeton University Press, 1993), pp. 228-242.

## The Soviet Union

In some respects the Soviets confronted a greater challenge than the United States. While Soviet nuclear weapon deployments were generally limited to Soviet territory and that of its Warsaw Pact allies, the United States had nuclear weapons positioned along the U.S.S.R.'s periphery in Western Europe, South Korea, and Turkey, and aboard aircraft carriers, among other places. Great Britain and France, close U.S. allies, also had significant numbers of nuclear missiles and aircraft equipped to carry nuclear bombs. Thus Moscow's attack warning could be—and in the Soviet leadership's eyes *was*—significantly less than Washington's.<sup>44</sup> As the United States prepared to forward-base highly accurate Pershing II missiles in Europe in the early 1980s following Moscow's deployment of SS-20 missiles, Soviet leaders confronted attack warning times of less than ten minutes.<sup>45</sup>

These conditions placed great stress on the Soviet's early warning and nuclear command and control systems, which were not nearly as capable as their U.S. counterparts. By the early 1960s Moscow had fielded a primitive system known as Monolit. The system transmitted orders employing cable and radio signals using code words and special packets, but it was slow and cumbersome. For example, the packets to be opened upon receipt of a special message contained orders to switch the system over to new signals and frequencies. This would have taken place at the very point in time where prompt and effective coordination was most critical and operator stress at its greatest. Moreover, once the orders were transmitted, they could not be revoked.<sup>46</sup>

Despite efforts to improve their early warning and nuclear command and control systems, the Soviets experienced problems with their early-warning satellites and radars.<sup>47</sup> These problems manifested themselves on the night of September 26-27, 1983, during the war scare described earlier in this assessment. Lieutenant Colonel Stanislav Petrov, the duty officer at Serpukhov-15, a missile attack early-warning station south of Moscow, received warnings from a Soviet satellite monitoring U.S. missile fields that an attack had been launched. The satellite system providing the information had been activated the year before, although

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<sup>44</sup> While both the United States and Soviet Union had ballistic missile submarines that could approach the other's coast prior to launch, the U.S. lead in this area remained strong throughout the Cold War, especially with respect to the accuracy of its submarine-launched ballistic missiles (SLBMs) and its ability to detect and track Soviet submarines. Moreover, the Soviets had a far smaller percentage of their nuclear warheads aboard submarines relative to their land-based missile and bomber forces than did the United States.

<sup>45</sup> The KGB concluded that the launching of strategic missiles from the continental United States provided Soviet leaders with roughly twenty minutes' reaction time, assuming the attack was promptly detected. Once the Pershing IIs were deployed, the reaction time would shrink to four to six minutes. Hoffman, *The Dead Hand*, p. 61.

<sup>46</sup> In 1967 Monolit was replaced by a system known as Signal. It could transmit a cancellation order. Signal was succeeded in the mid-1970s by Signal-M. *Ibid.*, pp. 146-48.

<sup>47</sup> Barrass, *The Great Cold War: A Journey Through the Hall of Mirrors*, p. 279.



it had not been fully tested; indeed, it was plagued by malfunctions. Shortly after midnight a siren alerted Petrov to a light at one of the American missile bases on a large map in the command center, indicating a missile launch. An electronic panel flashed (in Russian, of course) the words “LAUNCH” in red letters and “high reliability.” A complete check of the satellite reporting the launch and the center’s computer system would have taken some ten minutes to complete—too much time to lose if an attack was, in fact, under way. Petrov noted that only one missile launch had been detected, not the hundreds that would indicate a massive surprise attack. He considered the situation and informed his superiors that the indication was a “false alarm.” Shortly thereafter the system began reporting more launches from the American missile fields. Fortunately Petrov directed a check using data from the satellite’s crude optical telescope. They showed no launches. Petrov again reported the attack reports as a false alarm.<sup>48</sup>

When changes in U.S. nuclear strike options were made to target Soviet leaders themselves, this, combined with concerns about progressively shorter reaction times and their problematic early warning system, led the Kremlin leaders to pursue the capability to guarantee a retaliatory strike, even if they were incapacitated before the order to retaliate could be issued. Soviet leaders feared that a surprise U.S. first strike would destroy the radio and cable systems used to transmit orders to their nuclear forces, either directly or indirectly through the use of electromagnetic pulse (EMP) attacks.

The system they considered, known as the Dead Hand, was designed to order a nuclear retaliatory strike in the event that all senior political decision-makers and the military command structure were incapacitated. It envisioned computers receiving nuclear attack warning data, riding out any attack and then, if they failed to receive any instructions, ordering an automated nuclear retaliatory strike.<sup>49</sup> The concept shared much with the “Doomsday Machine” depicted in the motion picture “Dr. Strangelove.”<sup>50</sup> Fortunately “only” a modified version of the system was fielded in which the decision to launch would be made by a small cadre of officers in a deep underground command center.

That system, known as Perimeter, was tested in November 1984 and became operational a few months later. Soviet ballistic missiles placed in super hardened

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<sup>48</sup> Hoffman, *The Dead Hand*, pp. 5-11.

<sup>49</sup> *Ibid.*, p. 152.

<sup>50</sup> Herman Kahn reportedly outlined the idea of a “Doomsday Machine” in the 1950s. The machine would have a computer linked to an arsenal of nuclear weapons. In the event of a nuclear attack, sensors would pass the information to the computer, which would be programmed to order all the doomsday weapons to detonate, irradiating the planet in a lethal radioactive nuclear fallout shroud that would extinguish all human life. The doomsday machine could be seen as the ultimate deterrent to an attack, since the computer would automatically issue the order to detonate without human intervention, effectively discouraging efforts by an enemy to launch a sneak attack to destroy the opposing country’s nuclear forces before they could retaliate.

silos would be launched quickly upon alert of an attack by staff officers in their deeply buried military command center. These missiles would give the order to all remaining Soviet missiles to launch their attack on the United States. Oddly enough, the Soviets *never informed* the Americans about Perimeter, even though its purpose was primarily to deter a U.S. nuclear attack.<sup>51</sup>

If the two nuclear superpowers, with their enormous resources, continued to experience close calls with their early warning and command and control systems over thirty years into their nuclear competition, it would seem that the balance of terror between Israel and Iran, two states with far fewer resources to devote to these capabilities, would be fragile indeed. When one adds the exceedingly short time lines under which these systems would have to function, the problem only worsens. Moreover, the above examples from the Cold War occurred during “steady-state” or normal peacetime operations. In periods of crisis the chances for miscalculation would likely only increase. The nuclear showdown between the United States and the Soviet Union over the latter’s introduction of nuclear weapons to Cuba in the fall of 1962 offers a case in point.

### **Crisis Dynamics: The Cuban Missile Crisis, October 1962**

The risks of unauthorized or accidental use of nuclear weapons would almost certainly be heightened during a crisis involving a nuclear-armed Iran and Israel. To understand why, consider the challenges both superpowers faced during the Cuban Missile Crisis, arguably the closest the world has come to nuclear holocaust. Despite the efforts of President Kennedy and Chairman Khrushchev to avoid conflict, they often found events moving beyond their control, so much so that Dean Acheson concluded that the successful resolution of the crisis could only be attributed to “plain dumb luck.”<sup>52</sup> During the course of the crisis controls on both sides over the use of nuclear weapons were relaxed, breakdowns in communications occurred—both internally and between the two powers—and individual military units and personnel conducted operations that risked undermining the objectives of senior policy-makers to avoid a nuclear war. Given the compressed missile attack warning times for both Iran and Israel, preserving positive control over nuclear weapons could prove even more difficult. As in the Cuban Missile Crisis, the world could experience a situation where the leaders of Iran and Israel are trying to avoid war while the actions of elements of their armed forces send unintended, provocative signals to their rivals.

**The risks of unauthorized or accidental use of nuclear weapons would almost certainly be heightened during a crisis involving a nuclear-armed Iran and Israel.**

<sup>51</sup> Hoffman, *The Dead Hand*, pp. 124, 149, 153-54. Ironically, the Soviets in “Dr. Strangelove” also failed to inform the Americans of their “Doomsday Machine.”

<sup>52</sup> Dobbs, *One Minute to Midnight*, p. 353. Robert McNamara, the U.S. secretary of defense during the Cuban Missile Crisis, seconded Acheson’s observation, saying “We lucked out.” Robert S. McNamara, “For the Record,” *Washington Post*, June 18, 1998, p. A-24. Cited in Payne, *The Fallacies of Cold War Deterrence and a New Direction*, p. 91.

### Erosion of Positive Control

During the Cuban Missile Crisis some U.S. Air Force F-106 interceptor aircraft, each armed with its own nuclear weapon, were dispersed with only the pilot in control of the weapon. Other U.S. Air Force F-102 fighter interceptors were armed with Falcon air-to-air nuclear interceptor missiles when the United States went to DEFCON-3. At that point there was nothing to prevent a pilot from employing a nuclear-tipped Falcon missile once he was airborne.<sup>53</sup>

The Soviet's control over many of their weapons was even less secure than that of the Americans. While in theory the Soviet missiles in Cuba could only be fired on orders from Moscow, the absence of any codes or locks on the warheads meant that they could be launched on the initiative of a lieutenant, with a few soldiers' assistance. It could have been worse. During the crisis, Soviet defense minister Marshal Rodion Malenovsky prepared an order for Khrushchev's approval authorizing Soviet troops in Cuba to use "all available means" in their defense. Khrushchev rejected it, pointing out that, "If they were to use all available means without exception that would include the missiles. It would be the start of a thermonuclear war. How can we imagine such a thing?"<sup>54</sup>

During the U.S. Navy's blockade of Cuba, American warships conducted anti-submarine warfare operations against Soviet submarines with the objective of forcing them to surface, rendering them highly vulnerable to destruction.<sup>55</sup> The submarines each carried a nuclear-armed torpedo. In all, three Soviet submarines were forced to breach the surface. The Americans were unaware that the submarines were nuclear-armed. Nor were they aware that conditions in the Soviet submarines were so physically debilitating and their commanding officers under such strain from U.S. anti-submarine warfare operations that the officers, fearing they were under attack by U.S. forces, may have considered arming and employing the nuclear torpedoes.<sup>56</sup>

During the crisis the leaders of the two superpowers often had trouble communicating clearly to their own militaries as well as to each other. In the days

<sup>53</sup> Dobbs, *One Minute to Midnight*, pp. 40, 264. The Falcon missiles were air-to-air missiles designed to shoot down Soviet bombers.

<sup>54</sup> *Ibid.*, pp. 33, 206, 283-84.

<sup>55</sup> The Soviet submarines near Cuba needed to surface periodically to recharge their batteries. If forced to surface in the presence of U.S. warships they would be entirely vulnerable to destruction.

<sup>56</sup> William Burr and Thomas S. Blanton, eds., "The Submarines of October: U.S. and Soviet Naval Encounters During the Cuban Missile Crisis," National Security Archive Electronic Briefing Book No. 75, <http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB75/>. According to regulations, a nuclear torpedo could only be fired on receipt of a coded instruction from Moscow. Again, as with the case of American systems cited above, there were no special locks on the weapon to prevent its use. If a sufficient number of the submarines crew were in agreement (i.e., the officer in charge of the torpedo and the submarine's captain) the weapon could be employed. Dobbs, *One Minute to Midnight*, p. 302. According to some reports, in the case of one Soviet submarine the officers aboard thought that war had already broken out. They debated whether to use their weapons—including the nuclear torpedo—against the Americans and, by a vote of two-to-one they decided against it. Barrass, *The Great Cold War: A Journey Through the Hall of Mirrors*, pp. 143-44.

before the hotline, it took nearly twelve hours for messages from Kennedy and Khrushchev<sup>57</sup> to reach one another. Many of the signals and messages sent by the Kennedy administration to Moscow during the crisis were misinterpreted. In one instance Khrushchev responded to an erroneous intelligence report that Kennedy had scheduled a television address to the nation in which he would announce the onset of U.S. military operations against Cuba when, in fact, no such address was scheduled.<sup>58</sup>

At a key moment in the crisis while Kennedy was trying to avoid provoking the Soviets into escalating the crisis, a U.S. Air Force U-2 reconnaissance aircraft inadvertently flew into Soviet airspace, triggering the launch of Soviet fighter interceptors. At nearly the same time, to Khrushchev's horror, a Soviet surface-to-air missile (SAM) unit shot down a U.S. reconnaissance aircraft over Cuba.<sup>59</sup>

It is not difficult to imagine similar challenges being posed to leaders in Tehran and Tel Aviv should Iran and Israel confront one another during a crisis.

## Summary

The preceding discussion suggests that, should Tehran acquire a nuclear capability, the assumption that deterrence would almost certainly prevail should be viewed with skepticism. Based on the historical record and the circumstances in which Iran and Israel would find themselves, a nuclear competition between these two states will not necessarily find both sides refraining from taking what the other believes to be "absurd risks." There are all too many examples of instances where rivals greatly miscalculated one another's willingness to take such risks. Moreover, there is no compelling evidence that Iranian and Israeli leaders have a clear sense of how the other side calculates cost, benefit, and risk. Nor does it seem likely at this point that they would engage in confidence-building measures to promote such an understanding if Iran were to field a nuclear weapons capability.

Even assuming both nuclear states seek to avoid nuclear use, geographic realities combined with delivery-system speed and increasing accuracy may conspire to undermine their efforts. Ballistic missile flight times between the two countries are so short that even advanced early warning and command and control systems are likely to be inadequate to enable their leaders to have confidence that they can confirm the attack, decide upon an appropriate response, and issue the commands for executing the response. The problem may not be acute in the course of day-to-day or steady-state activities; however, in the event of a crisis these factors may create an irresistible temptation to strike first.

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<sup>57</sup> Dobbs, *One Minute to Midnight*, pp. 164, 346.

<sup>58</sup> *Ibid.*, p. 323.

<sup>59</sup> *Ibid.*, pp. 269, 293.

**What is ultimately clear is that the dynamics of an Iranian-Israeli nuclear competition will be unique and a stable balance between the two is hardly assured, particularly in periods of crisis.**

Alternatively one or both sides might look to devolve nuclear release authority to lower command elements to increase its rival's perception that, no matter what, a nuclear attack would guarantee nuclear retaliation. Assuming such a condition could be obtained, the gains might be offset by the risks that, with a greater number of fingers on the nuclear trigger, the chances of accidental or unauthorized nuclear use would increase as well.

The prospects for avoiding nuclear use might be enhanced if both sides are able to field secure second-strike forces capable of inflicting assured destruction.<sup>60</sup> As will be discussed presently, this may also prove challenging.

What is ultimately clear is that the dynamics of an Iranian-Israeli nuclear competition will be unique and a stable balance between the two is hardly assured, particularly in periods of crisis. Developing and sustaining a stable posture will require the kind of focused and persistent analysis and effort—both diplomatic and military—that enabled the United States and the Soviet Union to wage a forty-year global competition while (barely) avoiding tumbling into the nuclear abyss.

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<sup>60</sup> Assured destruction as defined here refers to the ability to inflict casualties and economic damage against a state such that it is annihilated as a functioning entity.

## CHAPTER 2: AN ISRAELI-IRANIAN COMPETITION

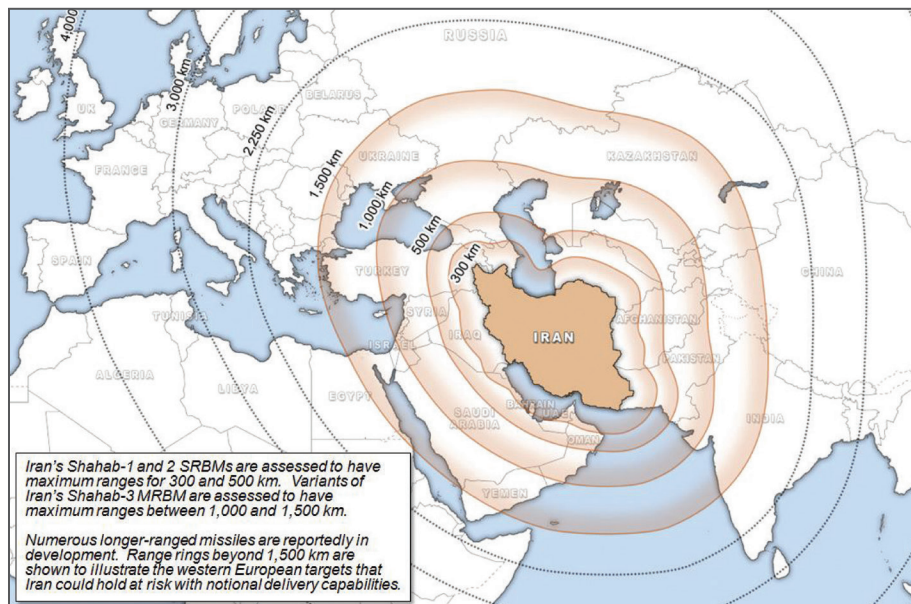
Regardless of whether Israel declares its own nuclear capability in the wake of the acquisition of nuclear weapons by Iran, it would confront the challenge of adapting its nuclear forces to account for the changed strategic environment. It is possible, of course, that Israelis will assume that Iran's nuclear arsenal exists solely to defend it against an existential attack. They therefore may perceive little need to make major adjustments in their nuclear forces. Given Iran's long-term hostility toward Israel, its record of aggressive behavior, and the threats its leaders have leveled against Israel, however, Israeli leaders may be unlikely to make such a sanguine assumption. Assuming Israel does not pursue preventive war against Iran, and that it continues to view its nuclear arsenal narrowly as the ultimate guarantor against nuclear attack, Israel will have to find a way to convey this "guarantee" to Iran's leaders. Simply put, the Israelis would be pursuing a strategy based on deterring an Iranian nuclear strike on their country.

### **Toward an Iranian Nuclear Posture**

Given Tehran's repeated declarations that it is not developing nuclear weapons, there is nothing in public domain in the way of an official statement or even an ongoing debate as to how Iran might posture its nuclear forces, or what its nuclear doctrine might be. What can be stated with a high degree of confidence is that, in addition to its efforts to produce plutonium and enrich uranium to weapons-grade levels, Iran has also been purchasing or developing and fielding delivery systems that would likely comprise part of an overall nuclear force posture. Principal among these capabilities are ballistic missiles, anti-ship cruise missiles, and submarines. Iran also has a modest air defense network that could be enhanced and expanded over time. It seems unlikely that Iran has the financial means, requisite technology, or sufficient skilled manpower to field, man, and maintain a state-

of-the-art early warning and command and control network of the kind required to deal effectively with the highly compressed warning times associated with an Israeli nuclear attack.

**FIGURE 2. IRANIAN BALLISTIC MISSILE RANGES AND DISTANCES TO POTENTIAL TARGETS**



Based on Tehran's recent and ongoing military efforts, an initial Iranian nuclear force would probably rely heavily on road-mobile ballistic missiles, such as the Shahab-3, as the principal form of delivering nuclear weapons to targets in Israel. Since Iran's existing missile forces do not appear accurate enough to destroy hardened or buried targets (e.g., missile silos),<sup>61</sup> Tehran's initial nuclear weapons would likely be targeted against "soft" counterforce (e.g., unhardened naval and air bases) and especially countervalue (e.g., population, economic infrastructure) targets. It would

<sup>61</sup> The mainstay of Iran's long-range missile force is currently the Shahab 3, which is inertially guided and believed to have a circular error probable, or CEP, of roughly 8,000 feet (1.5 miles), although some analysts believe it may be as low as 600 feet. This means that Shahab 3 missiles will land within this distance (i.e., between 600-8,000 feet) of their target 50 percent of the time. When delivering nuclear weapons, this degree of accuracy is "good enough" for large, "soft" targets like cities or airbases. Destroying underground bunkers and missile silos, however, requires a much higher degree of accuracy or significantly higher-yield weapons. "Shahab 3," *Missile Threat*, available at: <http://missilethreat.com/missiles/shahab-3/>; and "Shahab-3/Zelal-3," Federation of American Scientists, October 1, 2013, available at: <http://www.fas.org/programs/ssp/man/militarysumfolder/shahab-3.html>

also appear likely that initially Israel would be the primary, and perhaps exclusive, target of Iran's nuclear forces.<sup>62</sup>

## The Israeli Nuclear Posture

A nuclear-armed Iran would be the only state in the Middle East that could pose an immediate existential threat to Israel. Since the creation of an Islamic Republic in Iran, Israel (which Tehran calls the "Little Satan," analogous to its "Great Satan" reference to the United States) has been seen as its principal enemy in the region. Correspondingly, as the region's sole democracy and leading military power, Israel stands as the United States' most likely partner in addressing the challenge posed by a nuclear-armed Iran.

Israel appears likely to retain its current posture of nuclear opacity, even after an Iranian declaration. The Israeli national security establishment almost universally supports the current policy of opacity. The policy has provided the United States diplomatic cover vis-à-vis the international nuclear nonproliferation regime, moderated Arab nuclear ambitions, and allowed Israel to resist international political demands for denuclearization. Moreover, Israel's relatively early development of nuclear weapons has convinced the world that it is a nuclear power, thus deriving the deterrent value of a nuclear arsenal without paying significant diplomatic costs (such as risking sanctions from the international community). Iranian leaders presumably believe that Israel is a nuclear power. A formal declaration by Tel Aviv to this effect therefore would likely introduce international pressure and condemnation, but not enhance Israel's deterrent capability. Even as the Iranian nuclear threat has grown, Israel appears to have strengthened its commitment to the policy of opacity.<sup>63</sup>

Not surprisingly, Israeli leaders have been intensely focused on the Iranian nuclear issue, and are taking steps to hedge against a nuclear-armed Iran. These efforts are centered on enhancing the survivability of Israel's arsenal, the lethality of its weapons, and the responsiveness of its delivery systems. If and when Iran fields a nuclear capability Israel may also feel pressure to invest in highly visible defensive measures to protect the country's population and economic infrastructure. These measures could include expanded ballistic missile defense and civil defense programs. Importantly, while such efforts may be seen as enhancing Israeli deterrence of an Iranian nuclear strike, they may also be viewed as augmenting the Israel Defense Force's (IDF's) ability to execute a nuclear preemptive strike against Iran.

**Even as the Iranian nuclear threat has grown, Israel appears to have strengthened its commitment to the policy of opacity.**

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<sup>62</sup> American forward bases in the Middle East would be another likely set of targets for Iranian missiles, especially given the United States' close relationship with Israel.

<sup>63</sup> Avner Cohen and Marvin Miller, "Bringing Israel's Bomb out of the Basement," *Foreign Affairs*, September/October 2010, p. 35; see also Chuck Freilich, "Decision Time in Jerusalem," *The Journal of International Security Affairs*, Spring 2010, available at: <http://www.securityaffairs.org/issues/2010/18/freilich.php>.



Yet Israel's principal challenge is not likely to be maintaining an assured destruction capability against Iran, but rather attempting to cope with the enduring problem of geography. As with Iran, there may be little the Israelis can do to deal with the structural instability that is likely to emerge, particularly in crises, once Iran acquires a modest nuclear arsenal.

The following summary of Israel's current nuclear posture confirms Israel's strong initial position in any nuclear competition with Iran. Aside from the systems cited, Israel also likely enjoys a significant advantage over Iran in precision-guided weaponry and cyber weapons, although the latter cannot be confirmed.<sup>64</sup>

### Nuclear Posture and Doctrine

Reliable and accurate information about Israel's nuclear arsenal is difficult to obtain given its highly secretive status. Nevertheless, credible reports generally estimate that Israel possesses enough weapons-grade plutonium for one hundred to two hundred nuclear warheads. Some estimates place Israel's arsenal as high as three hundred nuclear warheads, composed primarily of two-stage thermonuclear devices.<sup>65</sup>

Israel's nuclear arsenal is believed to be in unassembled mode, with "fully functional weapons" capable of being assembled "in a matter of days."<sup>66</sup> Israel is assessed to possess a "triad" of delivery systems that includes nuclear-capable F-16I fighters, road-mobile Jericho ballistic missiles with estimated ranges of 1,800-3,000 miles (depending on the variant),<sup>67</sup> and five diesel-powered Dolphin-class submarines (with one more on order).<sup>68</sup> Israeli national security decision-makers since the late 1960s have conceived of Israel's nuclear arsenal solely as a deterrent against existential threats, and not as war-fighting instruments or means of coercion.<sup>69</sup> Israel's nuclear doctrine likely remains one of "defensive last

<sup>64</sup> See "Chapter Five: Middle East and North Africa," *The Military Balance* (London: International Institute for Strategic Studies, 2010), pp. 235-282.

<sup>65</sup> International Institute for Strategic Studies (IISS), "Analysts: Israel viewed as world's 6th nuclear power," *AFP*, April 10, 2010, available at: <http://www.iiiss.org/whats-new/iiiss-in-the-press/april-2010/israel-viewed-as-worlds-sixth-nuclear-power-analysts/>. See also Goldberg, "The Point of No Return."

<sup>66</sup> IISS, "Analysts: Israel viewed as world's 6th nuclear power."

<sup>67</sup> "Jericho 1/2/3 (YA-1/YA-3/YA-4)," *Jane's Strategic Weapon Systems*, September 11, 2012; and "Israel Test-Fires Nuclear-Capable Ballistic Missile," Press TV, September 8, 2013, available at: <http://www.presstv.ir/detail/2013/07/13/313543/israel-test-fires-nuclearcapable-missile/>.

<sup>68</sup> Barbara Opall-Rome, "Israel Inaugurates 5th Dolphin-Class Sub," *Defense News*, April 29, 2013, available at: <http://www.defensenews.com/article/20130429/DEFREG04/304290008/Israel-Inaugurates-5th-Dolphin-Class-Sub>. Three of the submarines are operational, with the fourth and fifth now undergoing sea trials.

<sup>69</sup> Avner Cohen, "Nuclear Arms in Crisis under Secrecy: Israel and the Lessons of the 1967 and 1973 Wars," in Peter R. Lavoy, Scott D. Sagan, and James J. Wirtz, eds., *Planning the Unthinkable: How New Powers Will Use Nuclear, Biological, and Chemical Weapons* (Ithaca, N.Y.: Cornell University Press, 2000), pp. 123-124.

resort,” with procedural safeguards in place to minimize the risk of accidental or unauthorized use.<sup>70</sup>

Of course, Israel’s posture and doctrine could change, perhaps dramatically, in the wake of Iran’s ascendance to the status of a nuclear weapons power. In this regard it is important to look beyond the period immediately following an Iranian acquisition of nuclear weapons. Despite Israel’s relatively large nuclear arsenal, its survivability could over time be a core concern given the country’s small size and limited strategic depth, the likely growth of an Iranian nuclear arsenal, and the extremely short intra-regional ballistic missile flight times that enable an attack with little or no warning. Under these conditions, Israel could take a number of steps to mitigate the vulnerability of its own nuclear forces to an Iranian first strike. For example, the IDF could keep nuclear-armed fighters either on 24-hour “strip alert” (ready to take off at a moment’s notice) or, perhaps less provocatively, in hardened bunkers where they could survive an Iranian first strike. It could also base nuclear-armed ballistic missiles in underground tunnels with multiple egress points. Following the pattern of the West’s nuclear powers, Israel could accord increased emphasis to its Type 800 Dolphin-class diesel-electric submarines based at Haifa.

Currently Israeli submarines and cruise missiles lack sufficient range to hold all targets in Iran at risk. Unless new, longer-range submarine-launched cruise missiles (SLCMs) are developed Israel may need to conduct patrols from the Arabian Sea or the Gulf of Oman. This would require increasing the range and/or endurance of its submarines. To conduct patrols in the Arabian Sea, Israeli submarines have to either pass through the Suez Canal (access to which is dependent upon Egypt) or go around the African continent (which would almost certainly exceed the limited endurance of conventionally-powered submarines and greatly reduce time on station compared with submarines operating in the eastern Mediterranean). Israel appears unlikely to build a second submarine base at Eilat in the Gulf of Aqaba. One Israeli naval source dismissed the likelihood of a second base, citing the lack of space at Eilat, the narrowness of the Red Sea, and the financial and logistical burdens of establishing and operating two separate bases.<sup>71</sup>

One clue as to whether Israel intends to shift to a preemptive posture from a deterrent posture may be found in how it chooses its undersea nuclear force patrol areas. Submarines patrolling in the Arabian Sea and Gulf of Oman would provide the Iranians with far less warning time of an attack than strikes launched from submarines patrolling in the Mediterranean Sea.

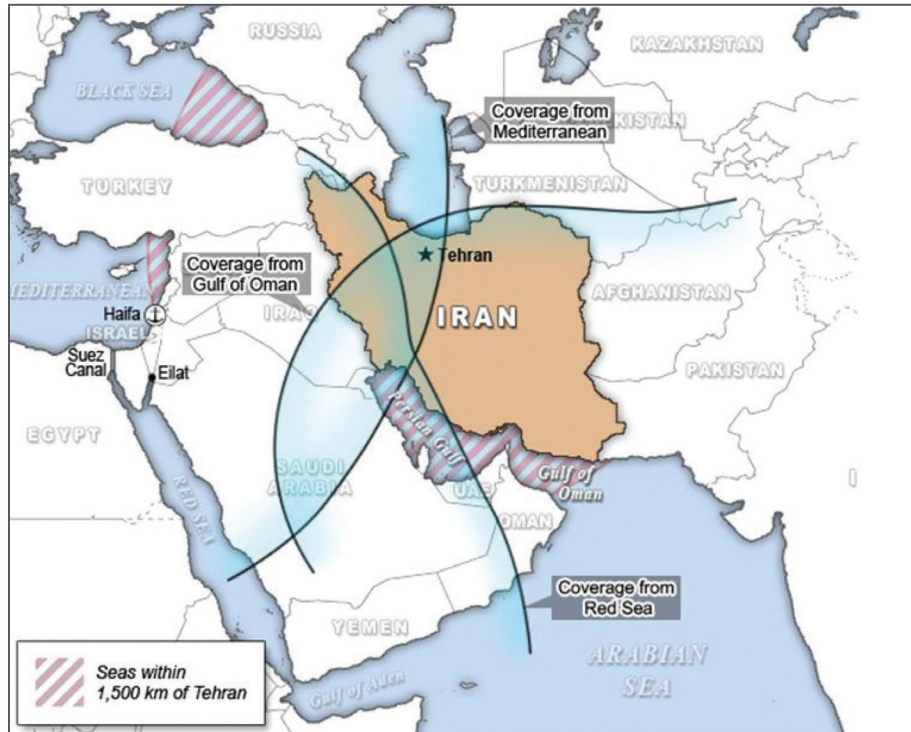
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<sup>70</sup> Cohen and Miller, “Bringing Israel’s Bomb out of the Basement,” p. 39.

<sup>71</sup> “Israel won’t base submarines in Red Sea, official says,” *Reuters*, May 7, 2009, available at: <http://www.ynetnews.com/articles/0,7340,L-3741747,00.html>.

**FIGURE 3. COVERAGE OF NOTIONAL 1,500 KM SUB-LAUNCHED CRUISE MISSILE**

Israel may continue investing in missile defenses to enhance the survivability of its nuclear retaliatory strike capability, protect its civilian population and economic infrastructure, or both.



### Missile Defenses

Israel may continue investing in missile defenses to enhance the survivability of its nuclear retaliatory strike capability, protect its civilian population and economic infrastructure, or both. In theory, missile defense systems such as the Arrow system could prove effective in intercepting Iranian ballistic missiles. Yet over the course of a long-term competition with Iran, significant investment in the Arrow places Israel at the wrong end of an Iranian cost-imposition strategy. Simply put, it would cost Iran far less to field additional ballistic missiles than for the Israelis to field additional missile interceptors, the early warning systems to detect an attack, and the command and control and battle management systems to enable an effective defensive engagement. What appears more likely is that Tehran, which in the foreseeable future would have far more ballistic missiles than nuclear warheads, would simply choose to launch saturation attacks in which only a fraction of the attacking force might be armed with nuclear warheads. Not knowing which missile or warheads carried nuclear weapons, the Israelis would be compelled to

try and intercept them all. Such attacks could prove effective in overwhelming and/or exhausting Israeli missile interceptors.

Despite the high cost of Israeli missile defenses relative to the cost to Iran of offsetting them, Israeli decision-makers may still maintain and even augment their country's ballistic missile defense if they adopt a preventive or preemptive nuclear posture. Ballistic missile defenses would be far more effective in the wake of an Israeli first strike against Iran's nuclear forces, particularly during the period where Iran's nuclear arsenal is relatively small, say in the range of a few dozen weapons. An Israeli first strike might leave the IDF's missile defenses to confront only a handful—not hundreds—of Iranian ballistic missiles, and only a few—rather than dozens—of Iranian nuclear warheads. Again, as with the other major elements of its nuclear posture, Israel's decisions on its ballistic missile defenses could provide powerful clues as to how it intends to pursue its nuclear competition with Iran.

### **Other Capabilities**

In addition to weapons capable of sustaining a preemption posture, Israel will likely need an improved counterforce capability, particularly against deep underground targets, including potential storage sites for Iranian nuclear weapons and delivery vehicles as well as hardened command and control centers. Israel will also almost certainly want more robust intelligence capable of providing early warning indications of an impending Iranian attack (e.g., imagery intelligence, signals intelligence, and human intelligence that could detect Iranian forces moving toward heightened alert; whether key government officials have dispersed to secure locations; etc.), as well as early warning of an attack that is already underway (e.g., rapid access to data from space-based platforms that can detect the heat signature from ballistic missile launches). These capabilities are likely to prove expensive to develop and, in some cases, prohibitively costly to deploy and maintain.

### **The Israeli-Iranian Nuclear Balance: Some Preliminary Observations**

Based upon this overview of potential Iranian paths to a deployed nuclear capability and Israeli counter-responses, what can be said about the principal characteristics of an Israeli-Iranian nuclear balance? Given Israel's lack of strategic depth and the concentration of its population in a few major cities, an Iran armed with even a half dozen to a dozen warheads would possess the capability to launch a devastating attack on Israel.

Given the limitations cited above, in the early period of the competition Iran will almost certainly focus exclusively on countervalue targeting because of Israel's small size, Iran's inability to destroy most or all of Israel's nuclear delivery systems, and the limited accuracy of Iranian missiles.

Considering its inability to absorb even a limited nuclear attack of a half dozen or so warheads and the limitations of ballistic missile defenses, Israel can be expected to attempt to maintain the option of executing a decisive, preemptive nuclear attack against Iran's nuclear arsenal if it believes an attack is imminent. Israeli leaders recognize that a first strike against Iran would likely be met with universal condemnation from the international community. Nevertheless, if the very survival of the state of Israel were at stake, then the costs of failing to execute a first strike would likely be viewed as far exceeding the benefits of exercising restraint. Accordingly, Israeli decision-makers will have strong incentives to pursue a counterforce capability in addition to a countervalue ("assured destruction") capability. Yet Iran's mobile missile launchers would very likely present significant challenges to Israeli efforts at counterforce targeting. The Israelis' problems could be further compounded if the Iranians hide some missiles in underground shelters, or acquire the technology to deploy nuclear-tipped cruise missiles at sea. As Iran's nuclear arsenal becomes more survivable through their growing numbers and/or diversification of delivery systems, the challenges associated with Israel maintaining a preemptive nuclear posture will only worsen.

The short warning times that would characterize an Iranian-Israeli nuclear competition will almost certainly pressure both sides to adopt a heightened alert status, especially in a crisis. Israel will choose to do so in order to preserve the option of launching a decisive first strike, and Iran will do so to avoid becoming the victim of such an attack. To the extent either side seeks to resolve the problem by placing its forces on a hair-trigger alert or extending nuclear release authority to lower commands, the risk of accidental launch or miscalculation would inevitably increase, especially during a crisis.

As will be elaborated upon in the following chapter, disruptive shifts in the nuclear balance will also come with the introduction of advanced technology, particularly with respect to Iranian nuclear forces. Unfortunately, such developments threaten to erode further what is likely to be a fragile regional stability.

## CHAPTER 3: THE NUCLEAR GREAT GAME

For reasons that will be elaborated upon presently, it is possible—even likely—that Iran’s acquisition of a nuclear capability would not only produce a regional nuclear competition with Israel, but also prompt other states in the region to acquire nuclear weapons, creating a multipolar nuclear competition. While the path toward a nuclear capability has historically been long and arduous, this may not be the case in the wake of Iran’s ascension to nuclear power status. Such a shock to the nonproliferation regime could precipitate its collapse. Saudi Arabia might exercise what some believe to be a standing option to acquire nuclear weapons from Pakistan, or to base Pakistani nuclear weapons on its territory with Riyadh exercising *de facto* control.<sup>72</sup> Or nuclear proliferation might occur on an accelerated schedule, with designs, components, and even fissile material—everything but

**While the path toward a nuclear capability has proven long and arduous, this may not be the case in the wake of Iran’s ascension to nuclear power status.**

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<sup>72</sup> Saudi King Abdullah stated, “If Iran developed nuclear weapons . . . everyone in the region would do the same.” A similar statement was made by Prince Turki al-Faisal, former head of Saudi Arabia’s General Intelligence Directorate. In 2012, a senior Saudi source declared, “There is no intention currently to pursue a unilateral military nuclear program but the dynamics will change immediately if the Iranians develop their own nuclear capability . . . politically, it would be completely unacceptable to have Iran with a nuclear capability and not the kingdom.” On the persistent but unconfirmed reports of a Saudi-Pakistani nuclear connection, see Naser al-Tamini, “Clear or Nuclear: Will Saudi Arabia Get the Bomb?” *Al Arabiya*, May 21, 2013, available at: <http://english.alarabiya.net/en/News/middle-east/2013/05/21/Will-Riyadh-get-the-bomb-.html>. See also *Chain Reaction: Avoiding a Nuclear Arms Race in the Middle East*, Report to the Committee on Foreign Relations, United States Senate (Washington, DC: Government Printing Office, 2008), pp. ix, 12, 20; and Ibrahim al-Marashi, “Saudi Petro-Nukes? Riyadh’s Nuclear Intentions and Regime Survival Strategies,” in *Forecasting Nuclear Proliferation in the 21st Century, Vol. II: A Comparative Perspective*, William C. Potter and Gaukhar Mukhatzhanova, eds., (Stanford: Stanford University Press, 2010), pp. 77-78.

an assembled warhead itself—being provided on an “installment plan” in a market where the barriers to transfer have all but collapsed.<sup>73</sup>

Some declared and undeclared nuclear powers, as well as non-nuclear powers that nevertheless have capable civilian nuclear enterprises outside the Middle East, might have strong incentives to assist states in the region seeking to create or enhance a nuclear posture. The region possesses the world’s greatest concentration of oil and natural gas, which are critical to global economic growth. The region is a key geostrategic location, with several maritime trade chokepoints such as the Suez Canal, Strait of Hormuz, and Bab el-Mandeb. Given their dependence on oil and natural gas to fuel their economies, the major powers of the developed and developing world have strong incentives to seek access to and influence in that region. In a proliferated Middle East, one way to achieve this would be to assist local states’ efforts to develop a nuclear weapons program or enhance their nuclear forces. In addition to North Korea, Pakistan, Russia, and (perhaps) India, support could come from states that are large oil and gas importers, or that have allies who rely heavily on such imports. The United States, China, the major EU economies (i.e., Britain, France, Germany, and Italy), Japan, and (perhaps) India would fall into this category. This could result in a latter-day nuclear “Great Game” where states external to the region compete for power and influence within it.

In such an environment three things seem clear. First, there would be many potential suppliers of nuclear weapons-related technology, and perhaps even of nuclear weapons. As is the case with the transfer of conventional military equipment and technology, the more suppliers there are, the more difficult it becomes to impose restrictions on such transfers. States might face a dilemma that if they do not provide certain equipment or capabilities, their rivals will do so, and the result will be that those states realize both influence and economic benefits. These transfers could also occur on an intraregional basis. Should other states within the region—Saudi Arabia, Turkey, and the United Arab Emirates (UAE), for ex-

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<sup>73</sup> Take the example of what Pakistan alone has provided and could provide to accelerate the rate of proliferation. It has, via the A.Q. Khan network, seeded parts of the developing world with nuclear weapon designs and key components (e.g., centrifuges). See *Nuclear Black Markets: Pakistan, A.Q. Khan and the Rise of Proliferation Networks: A Net Assessment* (London: International Institute for Strategic Studies, 2007). See also David Albright, *Peddling Peril: How the Secret Nuclear Trade Arms America’s Enemies* (New York: Free Press, 2010). Moreover, Pakistan’s projected production of plutonium will far exceed its projected arsenal’s requirements. There are reports that Pakistan may have completed a second nuclear plutonium production reactor (Khushab-II) near Khushab, which is the site of the country’s first plutonium production reactor (Khushab-I). A third reactor, Khushab III, is under construction. The two reactors are estimated to produce roughly 22 kg of plutonium a year, enough for 10 nuclear weapons. Assuming the third reactor is similar in design to the second (which it appears to be), within a few years Pakistan will be producing enough plutonium for thirty or more nuclear weapons each year. Paul K. Kerr and Mary Beth Nikitin, *Pakistan’s Nuclear Weapons: Proliferation and Security Issues* (Washington, DC: Congressional Research Service, June 2012), pp. 5-6, 26-27. See also Christopher Clary and Mara E. Karlin, “The Pak-Saudi Nuke, and How to Stop It,” *American Interest*, July-August 2012, pp. 24-31.

ample—develop their own nuclear capabilities or acquire them from an external actor, they might transfer weapons or technology to gain leverage with other Middle East states seeking a nuclear capability of their own.

Second, not all extra-regional suppliers would necessarily have a strong interest in regional stability. Major oil and gas exporters outside the region, Russia in particular, could potentially benefit from the corresponding increase in oil and gas prices that would accompany instability. Thus Moscow may be far less concerned about the consequences of its actions on regional stability.<sup>74</sup>

Third, even those states with an interest in stability cannot always be counted on to act in their own best interests. States have been prone to act in ways that value narrow, short-term interests at the expense of more important long-term interests.<sup>75</sup> For example, states like Pakistan or North Korea that are financially strapped may act primarily out of an immediate need for revenue and discount heavily the consequences of their actions on regional stability and their own long-term security. Nor can China be counted upon to exercise restraint, given its history of enabling nuclear programs in North Korea and Pakistan.<sup>76</sup>

The incentives for advanced nuclear powers and technologically sophisticated states to engage in technology and military system transfers would increase further if confidence in the United States' ability to maintain its dominant position in the region declines following Iran's acquisition of nuclear weapons. This confidence could be eroded further if U.S. efforts in Afghanistan and, especially, Iraq are viewed as ending in American defeats.

Perhaps most worrisome from Washington's perspective, the opportunities for other powers to displace its influence could increase dramatically if the United States (and perhaps its allies as well) withheld military support for nuclear-armed states in an effort to shore up the NPT regime. Should these efforts fail the United States could end up in the worst of both worlds: failing to achieve its nonproliferation goals while also losing influence with regional nuclear powers to extra-regional rivals.

Importantly, external support for regional nuclear powers in a proliferated Middle East would not be limited to nuclear weapons or related materials. Competitors possessing other military-related technologies, such as warhead minia-

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<sup>74</sup> This is not to say that Russia would seek to promote a nuclear war, or even a nuclear crisis. Yet as has been described above, political leaders are not always the masters of events once they are put in motion.

<sup>75</sup> For example, in the nuclear competition alone, China's support for Pakistan's nuclear program appears to be a case of pursuing short-term geopolitical gains at the expense of potentially far greater long-term problems, as described in this paper. Arguably, the U.S. pursuit of multiple independently targetable reentry vehicles (MIRV) technology, rather than first attempting to ban it through arms control agreements, proved short sighted as it ultimately worked to the relative benefit of the Soviet Union, whose far larger ballistic missiles could accommodate more warheads than their U.S. counterparts.

<sup>76</sup> See Reed and Stillman, *The Nuclear Express*, pp. 328-29.



turization and precision guidance could enable militarily advanced non-nuclear powers (e.g., Germany) to play a key role. Those providing support could justify the transfers as not violating the NPT regime (if one still exists following a proliferation cascade). Furthermore, these states may perceive the situation as an opportunity to forestall another great power competitor from providing military capabilities and thereby gaining influence.

### **Technology Transfer and Nuclear Competitions**

Israel would initially have a clear lead over Iran (and other proliferating states in the region) for some time following the latter's acquisition of a nuclear capability. Other powers, however, are likely to greatly influence the duration of that lead and the prospects for crisis stability. The transfer of advanced military technologies, even those not directly related to the production of nuclear weapons, could greatly change the nuclear balance, in relatively short order, with potentially dire consequences.

What kind of technical and material assistance is most likely to disrupt the various regional nuclear competitions? The following discussion offers some thoughts on this question, and argues that the most disruptive capabilities involve neither technologies directly related to nuclear weapons, nor those most aggressively pursued by the United States and Soviet Union during their Cold War nuclear competition.

#### **High-Priority Capabilities**

**Few technologies appear more attractive to an emerging nuclear weapons state in the Middle East than precision guidance.**

##### **Guided Weapons**

Few technologies appear more attractive to an emerging nuclear weapons state in the Middle East than precision guidance. Since it first employed precision munitions on an operationally significant scale in the Vietnam War, the United States has enjoyed a near-monopoly in precision guidance, exploiting it to great effect in Operation Desert Storm, Operation Iraqi Freedom, the war in Afghanistan, and the Cold War competition against the Soviet Union.<sup>77</sup> The precision-guided weapons revolution is now reaching the developing world, including states in the Middle East. At present the missile forces of countries such as Iran and Saudi Arabia are relatively inaccurate. Given limits on the yield of fission weapons, this will likely limit new nuclear powers to countervalue targeting, at least initially. As long as this condition holds, the region's nuclear powers may feel relatively safe from a disarming attack.

<sup>77</sup> For a history of precision-guided munitions and their disruptive influence on warfare, see Barry D. Watts, *Six Decades of Guided Munitions and Battle Networks: Progress and Prospects* (Washington, DC: Center for Strategic and Budgetary Assessments, 2007). See also Barry D. Watts, *Nuclear-Conventional Firebreaks and the Nuclear Taboo* (Washington, DC: Center for Strategic and Budgetary Assessments, 2013).

This will change as precision guidance is incorporated into these states' missile systems. Precision guidance, if combined with warhead miniaturization, could enable new nuclear powers in the region to field highly accurate nuclear-armed ballistic and cruise missiles. Given the short intra-regional flight times, highly accurate ballistic missiles would greatly enhance the prospects for executing a disarming *conventional* or *nuclear* counterforce first strike, particularly if good intelligence is available on the adversary's nuclear forces.

While the advantages of a nuclear ballistic missile force are well known, highly accurate cruise missiles could also provide a major advantage for the offense. Cruise missiles can be quite difficult to defend against as they can be launched from a wide range of platforms. They also have different flight profiles from ballistic missiles, requiring states that seek to defend against them to invest in air defenses as well as ballistic missile defenses. Precision guidance also increases the accuracy and therefore the effectiveness of nuclear gravity bombs.

Finally, conventional precision-guided munitions (PGMs) could enable both nuclear and non-nuclear regional powers to conduct strikes that generate nuclear-like effects without using nuclear weapons. For example, a PGM strike against a nuclear reactor in the region could produce a radiological event with nuclear-like effects. The potential for conventional weapons to induce nuclear-like effects could significantly erode the traditional firebreak between nuclear weapons and conventional munitions.<sup>78</sup>

### Warhead Miniaturization

Warhead miniaturization—the fabrication of nuclear weapons that are both small enough and light enough to be carried by ballistic and cruise missiles—was one of the major technological challenges the United States and the Soviet Union confronted in creating a nuclear-armed missile force. Those states unable to master or acquire this technology will have to rely on aircraft or on less traditional or novel means (e.g., a cargo ship in a harbor, suicide vehicle attack, etc.) as delivery systems. As with enhanced accuracy, warhead miniaturization appears to advantage the offense, because it enables nuclear strikes via ballistic missiles. All other factors being equal, ballistic missile strikes can be delivered in much shorter times and with much higher probability of penetrating an enemy's defenses than is the case for strikes employing other delivery means.

Warhead miniaturization also enables a state to deploy its nuclear weapons on cruise missiles that, owing to their relatively small size and modest launch system requirements, can be more difficult to detect than ballistic missiles. Cruise missiles can be employed on relatively simple launch platforms such as surface ships. They can also be more easily and inexpensively positioned on submarines

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<sup>78</sup> For an assessment of the eroding firebreak between nuclear and conventional munitions, see Barry D. Watts, *Nuclear-Conventional Firebreaks and the Nuclear Taboo*.

than can ballistic missiles. With a seaborne nuclear cruise missile force, either Iran or Israel could launch an attack against the other with relatively little warning and from multiple directions. For example, Iranian ships armed with cruise missiles could be positioned in the Mediterranean Sea. This would stress Israel's early warning and command and control systems, as they would have to detect attacks coming from multiple directions and with little or no warning. Of course, Iran could face the same problem from Israeli ships operating in the Arabian Sea.

### Cyber Weapons

Integrated network and electronic system attack are emerging as a major factor in warfare. In addition to being employed in acts of crime, espionage, industrial espionage, and low-level terror, cyber weapons have also been employed as a central element in major military operations (e.g., by Russia against Estonia in 2007 and Georgia in 2008). Cyber weapons may have the potential to cause catastrophic damage, for example by disrupting a state's power grid or financial system.<sup>79</sup> There are allegations that a computer worm, Stuxnet, infected the Iranian nuclear program's control system, which may indicate that cyber weapons have the potential to disrupt—or massively corrupt—military command and control systems.<sup>80</sup> Another computer worm, Conficker, has apparently infected millions of computers while frustrating efforts by both states and networks of computer specialists to break the worm's command link back to its originator, which is believed to be a non-state entity.<sup>81</sup>

Given these trends, cyber weapons could play a significant role in shaping the character of a competition among nuclear powers in a proliferated Middle East. Cyber weapons have relatively low barriers to entry. This suggests they could be employed both by states and non-state entities, opening up the possibility that a relatively wide range of actors could, for example, target the early warning and command and control systems—the “central nervous system”—of a state's nuclear forces. There are unconfirmed reports that in 2007 the Israelis employed cyber weapons against Syria's air defense system when executing their attack on a nu-

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<sup>79</sup> Andrew F. Krepinevich, *Cyber Warfare: A “Nuclear Option”?* (Washington, DC: Center for Strategic and Budgetary Assessments, 2012), pp. 39-66.

<sup>80</sup> See “The Stuxnet Worm: Yet to Turn,” *The Economist*, December 16, 2010, available at: <http://www.economist.com/node/17730556>. See also Paul K. Kerr, John Rollins, and Catherine A. Theohary, *The Stuxnet Computer Worm: Harbinger of an Emerging Warfare Capability* (Congressional Research Service, December 2010), available at: <http://www.fas.org/sgp/crs/natsec/R41524.pdf>.

<sup>81</sup> See Mark Bowden, “The Enemy Within,” *The Atlantic*, June 2010, available at: <http://www.theatlantic.com/magazine/archive/2010/06/the-enemy-within/8098/>. See also John Markoff, “Worm Infects Millions of Computers Worldwide,” *The New York Times*, January 22, 2009, available at: [http://www.nytimes.com/2009/01/23/technology/internet/23worm.html?\\_r=1&adxnml=1&adxnmlx=1296230565-ZeMd+yO1ZsVxNSAOX4vdxQ](http://www.nytimes.com/2009/01/23/technology/internet/23worm.html?_r=1&adxnml=1&adxnmlx=1296230565-ZeMd+yO1ZsVxNSAOX4vdxQ).

clear reactor under construction in that country.<sup>82</sup> If such systems could be compromised, it could raise doubts in the minds of a state's leaders as to their ability to detect an attack and/or employ their nuclear forces effectively.

This may pose major problems for regimes trying to maintain tight control over their nuclear weapons. How would a state's leadership adapt its nuclear posture if it believed it could not reliably control its nuclear forces? Israel, with its comparatively sophisticated cyber capabilities, would seem to enjoy some advantage over Iran and other potential nuclear-armed states in the region. Yet even Israel could not ignore the possibility that reputed cyber powers like Russia and China might offer to assist countries like Iran, both in protecting their command and control systems and in corrupting those of its adversaries.

The cyber problem presents a serious challenge to authoritarian regimes like Iran's. For such a regime, restricting nuclear release authority to as few individuals as possible would seem preferable. This would in theory mitigate the possibility of an unauthorized launch by a radical individual or acquisition (or even use) by a military faction attempting to overthrow the regime. On the other hand, as discussed in a previous section of this paper, tight control over nuclear forces also limits the ability to respond quickly in the event of a nuclear attack. Achieving a secure balance between tight controls for security purposes and devolution of launch authority is a significant challenge for both authoritarian and democratic institutions.

What steps might newly armed nuclear states in the developing world take to counter the cyber threat to their command and control systems, especially since their cyber capabilities are relatively primitive compared to those of Israel or major powers external to the region engaged in the Nuclear Great Game for influence in the Middle East? The answer may lie in whether the regime in question fears a surprise attack by an enemy state (e.g., for Iran, an attack by Israel at least initially) more than it does an accidental or unauthorized launch (which, if launched by Iran against Israel, would trigger a devastating Israeli retaliatory strike), and/or the weapons falling under the control of a breakaway element of its armed forces.

If fears of an Israeli preventive strike dominate Iranian leaders' concerns, they will be incentivized to decentralize release authority, either to ensure a launch-on-warning capability or a post-attack strike in the event that the regime's leadership is wiped out in an Israeli first strike. Correspondingly, if Iran's leaders' fears are primarily focused on the risks of unauthorized use of its nuclear weapons, then the regime would be expected to maintain centralized release authority of these weapons in the hands of a few leaders, or perhaps only the Supreme Leader himself. While the former course of action appears to increase the risk of nuclear use, the latter course would appear to increase Israel's incentive to execute a preven-

**Achieving a secure balance between tight controls for security purposes and devolution of launch authority is a significant challenge for both authoritarian and democratic institutions.**

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<sup>82</sup> There are reports that Israel used a cyber weapon in its September 2007 attack on a reputed nuclear reactor being built in Syria. Richard A. Clarke and Robert K. Knake, *Cyber War* (New York: Harper Collins, 2010), pp. 1-5.

tive attack, especially if it believes it can successfully corrupt the Iranian early warning or command and control system by employing cyber weapons.

Finally, one cannot discount the potential use of cyber weapons to trigger a catalytic war—i.e., the use of cyber weapons by one state or non-state entity to precipitate a war between two other states. As noted above, the barriers to entry for cyber capabilities are low enough that they are demonstrably accessible to non-state actors. This creates the possibility that radical non-state groups could compromise the early warning and command and control systems of nuclear powers and introduce false targets into the system, simulating the appearance of a missile attack when in fact none is occurring. During Cold War, both the United States and the Soviet Union had the technical means and the time to identify a false alarm, as they did in 1979 and 1983. Middle Eastern adversaries, with limited intelligence and less time in which to make a decision would not likely be so fortunate.

## Potentially Attractive Capabilities

### Missile Defenses

Neither ballistic nor cruise missile defenses appear to be particularly attractive investments for those states looking to minimize the consequences of a nuclear attack on their homeland. Kinetic missile defenses—to include the early warning systems, command and control networks, and the interceptor missiles that make the interception of incoming missiles possible—cost far more to field and maintain than the offensive weapons they defend against. Accordingly, a potential attacker can impose tremendous costs upon his adversary simply by building more missiles. Put another way, given equal resources, a state can deploy an offensive nuclear ballistic missile force that can overwhelm any defenses that a rival can field against it at a comparable cost. In theory, directed energy defensive systems (e.g., high-powered lasers) could reduce and perhaps even eliminate the cost disparity, but such defenses are at least a decade or more from being fielded by even the most advanced military powers.<sup>83</sup> Moreover, in addition to the disparity in the cost of the systems themselves, it seems highly likely that the kind of missile defense architecture described above would need far greater numbers of technically proficient operators, require them to engage in far more training to maintain their competence, and necessitate substantially more equipment maintenance than a ballistic missile force capable of overwhelming it. This would tilt the cost balance even further toward the offense.

*This calculus changes significantly, however, for those nuclear-armed competitors whose military posture calls for preemptive or preventive attack. In this*

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<sup>83</sup> Mark Gunzinger with Chris Dougherty, *Changing the Game: The Promise of Directed Energy Weapons* (Washington, DC: Center for Strategic and Budgetary Assessments, 2012), pp. 61-62.

instance, missile defenses would not need to bear the full weight of an enemy's ballistic missile attack, but rather to engage the presumably far fewer number of enemy missiles that might be launched following a first strike. This "offensive" approach to employing missile defenses could become even more attractive if a major military power external to the region—most likely the United States—were to commit its comparatively large missile defense forces to the balance.<sup>84</sup>

### **Intelligence**

States may seek access to information provided by advanced intelligence organizations outside the region. Of particular value would be intelligence that provides early warning and targeting information. As Operation *RYAN* and the 1983 Soviet scare demonstrate, however, more intelligence is not always accurate or stabilizing. In a proliferated Middle East it is not clear whether this intelligence would serve to diffuse or exacerbate a crisis. For example, if Israel were to receive warning that Iran was placing its nuclear forces on a high alert status, it could be interpreted as Tehran preparing to launch a first strike, thereby incentivizing the Israelis to launch a preemptive strike, believing it to be their best chance of survival. In this case enhanced targeting intelligence might further increase the incentive to execute a preemptive attack.

Intelligence concerning the leadership and governments of regional competitors is likely to be valued. In particular, intelligence that provides insights as to who among the leadership has the authority to make decisions regarding that state's nuclear posture and nuclear weapon employment, including how these leaders assess costs, benefits, and risks, would be most useful. Information regarding the development and fielding of new capabilities by regional rivals, to include everything from new weapons and delivery systems to changes in doctrine or upgrades to early warning and command and control systems, would obviously be of value.

Of course, this assumes that a regional nuclear power would trust the intelligence being provided. While this may be true in many cases, it cannot be considered a "given." In intelligence relationships, confidence is established over time, as the intelligence provided is proven accurate, or its conclusions corroborated by the recipient state's own intelligence arm. In matters of national survival, political and military leaders will likely demand high confidence in the products of their own intelligence agencies, and could well hold foreign intelligence products to an even higher standard. It seems likely that in cases where a country's supreme national interests are at stake (e.g., its survival), it may use foreign intelligence provided by liaison services to confirm its own intelligence findings.

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<sup>84</sup> Such an effort could be offset—again at far less cost—by other powers involved in the Nuclear Great Game assisting local powers to enhance their offensive capabilities (e.g., providing additional ballistic or cruise missiles, ballistic missile penetration aids, etc.).

**Iran's acquisition of a nuclear capability could collapse the international nonproliferation regime, leading to a nuclear arms market.**

### **System Support**

Maintaining a nuclear force involves more than simply possessing nuclear weapons. It also requires a support system. Sophisticated maintenance support is needed to preserve the reliability of nuclear weapons. Worn or corroded parts of the weapon must be monitored and replaced over time, while some elements of certain weapon designs, such as the tritium in boosted fission weapons, must be periodically replenished. While an effective nuclear force requires weapon maintenance, greater still are the maintenance requirements for aircraft. Pilots must fly in order to develop and sustain a sufficiently high standard of proficiency.<sup>85</sup>

To date, states that have acquired their own nuclear weapons capabilities have developed the requisite nuclear infrastructure to sustain them indigenously. The infrastructure in which they invested in order to produce the weapons is used to maintain the weapons and associated delivery systems. There exists, however, the possibility that in the wake of Iran achieving a nuclear capability, a more expeditious path to nuclear-armed status may emerge. As noted above, Iran's acquisition of a nuclear capability could collapse the international nonproliferation regime, leading to a nuclear arms market. Even if Iran does not offer to sell nuclear weapons to others, the nonproliferation regime will suffer if, for example, Saudi Arabia pursues an express path to nuclear status via the transfer of nuclear weapons from Pakistan.

Regardless of the state of the nonproliferation regime, Middle East countries may wish to build the necessary infrastructure and support capabilities required for an indigenous nuclear weapons program. The prestige that states seek through a nuclear capability would certainly be more compelling if the state demonstrated the economic and technical capacity to develop an indigenous program. The deterrence power of an indigenous program is stronger as well. A state with the capability and capacity to ensure the safety and effectiveness of its stockpile holds a more credible arsenal than a state that purchased a nuclear weapon from a different producer. That being said, because of the great difficulty, expense, and time associated with building a nuclear weapons-production capability, it seems far more likely that states in the Middle East with nuclear ambitions would look to acquire them from other nuclear powers. These acquisitions could be augmented with non-nuclear capabilities that are obtained from states that, while not nuclear armed, have sophisticated military forces. The latter route is likely to be more expeditious (especially if proliferation barriers and technology control regimes are weakened by Iran's acquisition of a nuclear capability), and quite likely cheaper as well.

Providing such support may of course create issues for established nuclear powers. Foremost among these is the legal prohibition that any NPT member fac-

<sup>85</sup> For an overview of U.S. maintenance of its nuclear arsenal, see *U.S. Nuclear Weapons Budget: An Overview* (Center for Nonproliferation Studies, September 2013).

es regarding assisting a non-nuclear weapon state (NNWS) with acquiring a nuclear weapon. Therefore, this scenario would only be possible if the nuclear weapon state first withdrew from the NPT, or violated it. Even then, other problems emerge. If the United States, for example, were to assist one new nuclear-armed state—say, Saudi Arabia—such assistance could undermine the U.S. relationships with other states in the region. Israel could strongly oppose U.S. efforts to help an Arab state maintain its nuclear forces, even if they were intended as a counterweight to Iran’s nuclear capability. Substantial opposition to providing support could also arise domestically, from supporters of Israel and/or supporters of the NPT regime. If the opposition succeeded in blocking U.S. assistance, it might simply create opportunities for other nuclear powers to fill the void.

### **Likely Low-Priority Capabilities**

#### **Thermonuclear Weapons**

Given the relatively small size of Middle East states compared to the United States and Soviet Union, a regional nuclear state’s ability to field thermonuclear weapons, whose yield can be much greater than fission weapons, may not be considered as important as it was during the Cold War. This is especially true if the technologies associated with the precision-guided weapons revolution are in these states’ possession, given that the more accurate is the delivery system, the lower the yield of the weapon needed to destroy a given target. The relatively small size of the states involved in this competition would seem to enable regional nuclear powers to achieve desired destructive capability with fission weapons, whose yields can be boosted to 100 kilotons (KT) of TNT or more. Save for the prestige value of having thermonuclear weapons in one’s arsenal, it is not clear that acquiring them would be worth diverting the necessary resources to do so.<sup>86</sup>

#### **Multiple Independently Targetable Reentry Vehicles (MIRVs)**

A MIRVed ballistic missile is one armed with more than one nuclear warhead capable of being oriented on a target independent of the targeting of its sister warhead(s). For example, the U.S. Minuteman III MIRVed ICBM was armed with three nuclear warheads, whereas the Soviet SS-18 ICBM was armed with ten warheads. The “MIRVing” of the superpowers’ missiles during the Cold War gave rise to increasing fears of one side executing a disarming first strike against the other. This is because a MIRVed missile has the potential to destroy more than one rival missile and thus enjoys a favorable exchange ratio.

The United States pursued MIRVs for a number of reasons, principal among them were that MIRVs:

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<sup>86</sup> That being said, as Israel is reported to have thermonuclear weapons, Iran’s acquisition of such weapons could become a priority for Tehran and for other states in the region.



- Provided greater target damage for a given missile payload, as several small warheads cause much more target damage area than a single large one;
- Enabled multiple targets to be struck, and across a broad area, whereas single-warhead missiles can only strike one target;
- Reduced the impact of arms control treaty limitations, specifically the Strategic Arms Limitation Talks (SALT) Treaty that limited the number of missiles, but not number of warheads; and
- Complicated the challenges confronted by missile defenses that intercept individual warheads, either in their mid-course phase or terminal phase.

**During the Cold War both superpowers had “nuclear plenty” before they had “missile plenty.” The opposite is true with respect to Iran, and may hold for other prospective regional proliferants as well.**

Yet the introduction of MIRV technology into a proliferated Middle East may not have the same implications it did during the Cold War. In part this is due to the fact that whereas during the Cold War possession of nuclear weapons preceded the development of ballistic missiles and enhanced guidance, the opposite is true in the case of the Middle East. Put another way, during the Cold War both superpowers had “nuclear plenty” before they had “missile plenty.” The opposite is true with respect to Iran, and may hold for other prospective regional proliferants as well. States like Iran and Saudi Arabia already possess ballistic missiles with considerable range. In Iran’s case they may number in the hundreds. Given these circumstances, and the absence of a SALT-like arms control regime that limits launchers, it would seem that competitors, either in an Israeli-Iranian competition or an “n-state” multipolar competition, might have little use for MIRVs, at least early on. During this phase of relative “missile plenty,” competitors will likely be incentivized to distribute their nuclear warheads among as many missiles as possible, so as to avoid concentrating their arsenal’s “eggs” in too few missile “baskets” and, by so doing, creating attractive targets and incentivizing an enemy to execute a preemptive strike.

To be sure, authoritarian regimes concerned with maintaining internal control may concentrate their nuclear arsenal so as to preclude a disloyal subordinate from seizing control over even a few weapons. Yet the circle might be squared here if single-warhead missiles are kept relatively concentrated—in garrison, so to speak—and only “flushed” out to their launch points in the event of crisis.

Competitors in a “missile plenty” era may also disdain MIRVs if they are relying on missile saturation attacks to defeat enemy missile defenses. For example,

assuming it had the ability to do so, an Iran with two hundred missiles and twenty warheads would be less inclined to MIRV four missiles with five warheads each than to place one warhead on each of twenty missiles. Not only does this provide flexibility in terms of sizing a nuclear attack, it also reduces the chances of a “catastrophic” preemptive strike along the lines described above.

There is also the matter of missile reliability. While some newly armed nuclear states might have substantial numbers of ballistic missiles—Iran especially—their reliability is likely significantly less than U.S. missiles. Thus distributing nuclear warheads among missiles, rather than concentrating them, would enable states like Iran to hedge against a catastrophic loss of nuclear weapons should one of its ballistic missiles fail to perform as intended.

Although MIRVs may not be high on the priority list of nuclear-armed states in a proliferated Middle East, this is not to say that they should be discounted entirely. Israel may develop considerable interest in MIRVs. This could stem partly from Israel’s small size, which may preclude it from maintaining a sizeable ballistic missile force spread out over a broad area, either in a fixed mode or in a road mobile configuration. It is conceivable that the Israelis might prefer a MIRVed ballistic missile force to limit the amount of land the force would require for its deployment. Should Israel decide to position part of its nuclear forces on ballistic missiles at sea in submarines, MIRVing these missiles would significantly reduce the cost of the force by reducing the number of submarines required to be on patrol at any given time to have a given number of nuclear weapons at sea.<sup>87</sup> Finally, unlike Iran, by most accounts Israel enjoys “nuclear plenty.” This, combined with the incentives Israel may have to maintain a preventive and preemptive nuclear strike option against Iran, could make the MIRVing of its Jericho missiles attractive.

### Depressed Trajectory Missiles

Ballistic missiles capable of being fired along a depressed trajectory offer an attacker employing them the ability to strike a target more quickly than with a missile following a standard ballistic trajectory. Given the very short missile flight times between launch points and targets in the Middle East, however, a depressed trajectory capability would seem to offer little in the way of additional advantage. Depressed trajectory missiles also incur a penalty in terms of decreased accuracy, which could be an important factor in any attack seeking to destroy hardened targets, especially with fission warheads.<sup>88</sup> Of greater importance, they consume

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<sup>87</sup> Of course, if Israel’s enemies have a highly capable anti-submarine warfare (ASW) capability, the Israelis might want to disperse their warheads among several boats to minimize their vulnerability. None of Israel’s prospective enemies has such a capability, however, nor do they seem likely to acquire one in the foreseeable future.

<sup>88</sup> See Jonathan Medalia, *Fast-Trajectory Strategic Ballistic Missiles* (Washington, DC: Congressional Research Service, 1990).

more fuel to travel an equivalent distance, thereby reducing the weapons' range or payload.<sup>89</sup> Given these factors, depressed trajectory missiles would not appear to be a high priority for nuclear-armed states in a proliferated Middle East.

### **Submarines**

Regional nuclear powers might, over time, seek to insulate their limited nuclear forces from attack by moving some of them to sea, especially on submarines that are difficult to track and consistently hold at risk. During the Cold War, the United States, Soviet Union, Britain, and France all came to rely on nuclear-armed submarines as the ultimate guarantor of secure second strike capability, while China and India are both striving to field an undersea nuclear deterrent.<sup>90</sup> This approach would be especially attractive to Israel, for several reasons. First, the Israelis have already mastered cruise missile technology and submarine operations. Second, the country's small size significantly constrains its ability to disperse land-based weapons or keep them mobile.

For the other countries in the region, however, developing an effective submarine-based deterrent would likely be an extremely difficult and expensive proposition. This suggests that regional nuclear powers, save perhaps for Israel, would accord higher priority to expanding their land-based nuclear forces before considering a seaborne deployment. Moreover, it also seems probable that a robust command and control system capable of reliably communicating with submarines would need to be in place prior to deploying a sizeable portion of one's nuclear arsenal undersea, something that Middle Eastern states with relatively modest economic means and modest technical proficiency would likely find difficult to accomplish.

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<sup>89</sup> See Ashton B. Carter and David N. Schwartz, eds., *Ballistic Missile Defense* (Washington, DC: Brookings Institution, 1984), p. 57.

<sup>90</sup> For China's undersea nuclear deterrent development see Andrew S. Erickson and Lyle J. Goldstein, "China's Future Nuclear Submarine Force: Insights from Chinese Writings," in *China's Nuclear Submarine Force*, Andrew S. Erickson et al, eds. (Annapolis: Naval Institute Press, 2007). For India's, see Lydia Polgreen, "India Launches Nuclear Submarine," *The New York Times*, July 26, 2009, available at: <http://www.nytimes.com/2009/07/27/world/asia/27india.html>.

## Summary

Unlike the U.S.-Soviet nuclear competition during the Cold War, a Middle East nuclear rivalry will likely be influenced significantly, if not dramatically, by the actions of powers external to the region. External powers are apt to engage in a Nuclear Great Game featuring the provision of nuclear and military assistance as a means of vying for influence in the region. Should the nonproliferation regime subsequently collapse and other states in the region acquire nuclear weapons the situation would almost certainly become even more complicated.

Among the technologies and capabilities that are likely to be in highest demand by new nuclear powers in the region are those related to warhead miniaturization and precision guidance. Missile defenses, various forms of intelligence (e.g., early warning and rivals' calculus of cost, benefit, and risks), and nuclear force sustainment support will also likely be valued, while thermonuclear weapons, MIRV technology, depressed trajectory ballistic missiles, and missile-carrying submarines are apt to be accorded lesser priority.

The following chapter examines some prospective dynamics of a Middle East in which Iran's acquisition of a nuclear capability triggers a proliferation cascade in the region. Such a cascade could develop as other powers scramble to offset Iran's rising power and hedge against diminishing U.S. influence.



## CHAPTER 4: A PROLIFERATED MIDDLE EAST

### Path Dependency

The path along which the Middle East could move from two states possessing nuclear weapons—Israel and Iran—to a situation in which a number of states have them may exert a significant influence on the characteristics of nuclear competition in that region. If, for example, the bipolar competition between Israel and Iran is characterized by heightened tensions (or nuclear use), other regional powers will likely be more incentivized to pursue nuclear capabilities of their own. The same can be said if a nuclear-armed Iran increases the scope or intensity of its ambiguous aggression (e.g., subversion, support for terrorism) against other states in the region, or if the nonproliferation regime collapses in the wake of Iran achieving a nuclear capability.

On the other hand, if Iran initially refrains from aggressive behavior or follows the Israeli model and builds nuclear weapons but does not openly declare its status as a nuclear-armed state (or demonstrate its capability through a test), the pace of proliferation may be far slower. The relative rate of proliferation might also be slowed if Iran offers to engage in negotiations with respect to its nuclear arsenal, much as North Korea has continued work on its nuclear program while engaging in discussions from time to time. As discussed in Chapter 1, Tehran could have a strong incentive to pursue this Pyongyang Gambit, for example by offering to negotiate a Middle East NWFZ or WMDFZ. This could put pressure on Israel to respond while alleviating some pressure from Iran's NPT violations. It might also give cover to other states anxious to lean on even the weakest of reeds in the hope that they might somehow avoid facing the formidable problems associated with a nuclear-armed Iran. Still other powers external to the region that are interested in establishing a strong position in the Great Game might embrace these negotiations as they make their initial forays into the region and put out feelers to prospective client states

Regardless of the pace of proliferation, no one can be certain at this point which additional states will acquire a nuclear weapons capability, or in what order, or how quickly. For the purposes of examining the character of a proliferated Middle East, this assessment assumes that in addition to Israel and Iran, after a relatively brief time lag (three to eight years), Saudi Arabia, Turkey, and possibly Egypt and/or Iraq join the nuclear club, creating a region comprising five or six nuclear-armed states.<sup>91</sup>

### The Early Phase

Over the near-term Israel is likely to maintain a dominant position in which its nuclear arsenal and capabilities far outstrip those of its neighbors.

Despite the uncertainties of which path the region will follow toward a multipolar nuclear competition once Iran achieves nuclear-armed status, several things seem clear. First, even if Saudi Arabia, Turkey, and/or Egypt follow Iran into the nuclear “club,” over the near-term Israel is likely to maintain a dominant position in which its nuclear arsenal and capabilities far outstrip those of its neighbors. Absent a large-scale transfer of nuclear weapons from an established nuclear power to a regional nuclear aspirant, for perhaps a decade or so Israel’s arsenal will likely far exceed the combined arsenals of all other nuclear powers in the region both in terms of the numbers of nuclear weapons and their respective yields. To employ an historical analogy, this period may be similar to the *Pax Britannica* of the late nineteenth century in which the British Navy’s force of battleships and heavy cruisers far exceeded the size and capability of any rival, to the point where Great Britain was able to adopt a “two-power” standard posture, wherein its navy was sized to exceed the combined strength of the world’s second and third largest fleets. While Israel, like Britain, might lose its formidable advantage over time, early on it will likely maintain a very robust preventive strike capability as well as an assured destruction capability, especially considering that its rivals will also

<sup>91</sup> The Saudis have already sent signals they would pursue a nuclear capability if Iran acquires the bomb. “Prince Hints Saudi Arabia May Join Nuclear Arms Race,” *New York Times*, December 6, 2011. Prince Turki al-Faisal, who has served as the Saudi intelligence chief and as ambassador to the United States, has stated the kingdom might consider acquiring a nuclear capability if Iran obtains one. The Prince declared “It is our duty toward our nation and people to consider all possible options, including the possession of these weapons.” Turkey, through its ambassador to the United States, has said that Turkey will not tolerate Iran acquiring nuclear weapons but has left the issue of whether it would pursue its own nuclear arsenal open. Jeremy Herb, “Ambassador: Turkey ‘Cannot Tolerate’ Iran Getting Nukes,” *The Hill*, December 8, 2011, available at: <http://thehill.com/blogs/defcon-hill/policy-and-strategy/198237-ambassador-turkey-cannot-tolerate-iran-getting-nukes>. See also Charles S. Robb and Charles Wald (chairs), *The Price of Inaction: Analysis of Energy and Economic Effects of a Nuclear Iran* (Washington, DC: Bipartisan Policy Center, 2012), p. 20. Both Egypt and Iraq would need substantial technical and likely major economic assistance as well to develop a nuclear capability in the time frame advanced in this assessment. See “Egypt,” *Nuclear Threat Initiative*, available at: <http://www.nti.org/country-profiles/egypt/nuclear/>; “Nuclear Weapons Program,” *Federation of American Scientists*, available at: <https://www.fas.org/nuke/guide/egypt/nuke/index.html>; “Iraq,” *Nuclear Threat Initiative*, available at: <http://www.nti.org/country-profiles/iraq/nuclear/>; and “Iraqi Nuclear Weapons,” *Federation of American Scientists*, available at: <http://www.fas.org/nuke/guide/iraq/nuke/program.htm>.

likely lack effective air and missile defenses, early warning, and command and control systems.

Unlike the Britain of a century ago, however, there are several reasons why Israel will not reap a comparable level of security with its nuclear advantage. First and foremost, even a handful of Iranian nuclear weapons of relatively modest yield properly targeted could inflict devastating damage on the Israeli people and their economy. While Israel may not be a one-bomb country as Rafsanjani described it, neither is it a country that can absorb an attack involving a half-dozen well-placed nuclear weapons.

Second, for reasons that will be addressed presently, the use of extended deterrence—offering regional partners the protection of the U.S. nuclear umbrella—may be inadequate to deter its beneficiaries from pursuing their own nuclear weapons.

Third, given the threat that Iran poses to many states in the region, non-nuclear countries will likely seek extended deterrence guarantees from regional nuclear powers, the United States, and perhaps over time from other powers external to the region, such as China, India, Pakistan and Russia. The search for nuclear patrons by vulnerable states threatened by a nuclear Iran seems likely to be primarily—and perhaps even exclusively—an “Arab problem.” The Persian and Turkish nationalities will have nuclear weapons and (in the case of the Turks with the United States and NATO) also possess a nuclear guarantee. It seems unlikely, although not impossible, that Arab states looking for a nuclear patron might explore a security relationship with Israel or Turkey. This suggests that any Israeli leader looking to leverage his or her country’s superior nuclear arsenal against a regional nuclear rival would also have to confront a major nuclear power that has placed a “nuclear umbrella” over the target state.

There are potentially significant implications for those Arab states contemplating a nuclear capability as a means of asserting their leadership in the Arab World. A nuclear-armed Iran may provide an additional incentive for the Saudis to acquire a nuclear capability, and to do so quickly, so as to establish Riyadh as the Arab world’s first nuclear power and the ally of choice for other Arab states. This could make the “Islamabad Option” (the acquisition of nuclear weapons from Pakistan, or the basing of “Pakistani”<sup>92</sup> nuclear forces on Saudi soil) an attractive one for Riyadh. For other major Arab powers such as Algeria, Egypt and Iraq, the implications of a nuclear-armed Saudi Arabia are also clear. It is likely that the need to compete for leadership and influence among the other Arab states will be part of any Saudi decision-making calculus should it consider pursuing a nuclear weapons capability.

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<sup>92</sup> It is possible that these nuclear weapons may be Pakistani in name only and that real control over their employment would rest with the Saudis.

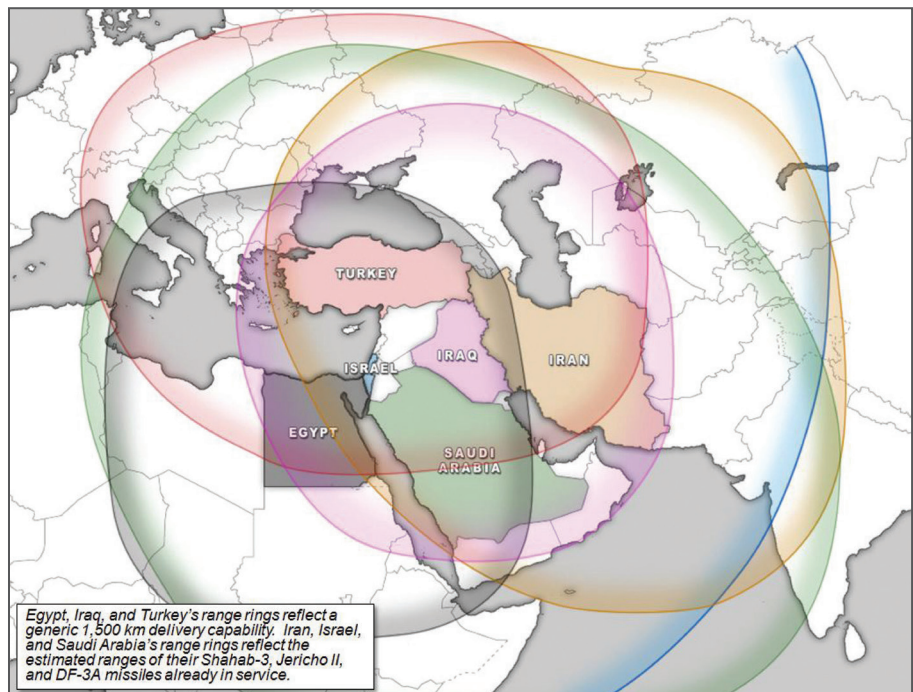


## Mature Phase

### Beyond “MAD” and “Parity”

As more countries over time develop nuclear capabilities and build up their nuclear arsenals, the competition will evolve from an Israeli-Iranian affair to a multi-state rivalry. For illustrative purposes we will assume that in the 2025-2030 timeframe, Iran, Saudi Arabia, Turkey, and perhaps Egypt and/or Iraq have nuclear arsenals in the low double-digit range (i.e., ten to forty weapons). What form might a nuclear competition among these powers and Israel assume? The remainder of this chapter attempts to shed some light on this issue, and its potential implications, with emphasis on those affecting regional stability.

**FIGURE 4. NOTIONAL NUCLEAR WEAPONS COVERAGE IN A PROLIFERATED MIDDLE EAST**



The challenge of preserving stability when confronted with military competition among five nuclear-armed states within the Middle East and with other powers external to the region engaged in a Great Game for influence is formidable. At first blush, one thing seems apparent: many Cold War-era metrics for assessing the competition and gauging where it might be headed appear to be of little utility; in fact, they may actually prove misleading and dangerous. The same can be said of those looking to apply Cold War-era arms control metrics as a way of keeping the peace in general and avoiding nuclear use in particular.

During the Cold War, many nuclear strategists came to view nuclear parity (the possession of roughly equivalent arsenals capable of inflicting roughly equivalent levels of destruction) between the United States and the Soviet Union as stabilizing. The perception of these strategists is that the rough equivalence contributed to the tradition of non-use of nuclear weapons, and was thus desirable. Parity enabled both sides to avoid the perception of being inferior to their rival, and perceptions are critical to deterrence and to preserving the confidence of one's allies and security partners. If accepted by both sides, parity could enable them to avoid the cost and instability associated with "racing" toward ever-larger arsenals. Accordingly, maintaining parity was a major objective of U.S.-Soviet (and later U.S.-Russian) arms control negotiations. Yet irrespective of its merits, parity is not an option for states engaged in an n-player competition. Each competitor cannot have a nuclear force equivalent to all the others. Even if the competition should solidify into two coalitions so as to mimic the two-player Cold War competition, questions would almost certainly arise regarding the willingness of a coalition partner that has not been attacked to risk its own destruction by using its nuclear weapons in response to an attack on its ally. Indeed, these concerns were raised during the Cold War, and formed a major justification for France pursuing its own *force de frappe*.<sup>93</sup>

In a Middle Eastern "n-player" competition, all nuclear powers would be challenged to establish an "assured destruction" capability against all the other regional nuclear powers, another Cold War desideratum, given their relatively modest economies. An "assured destruction" capability in an n-state competition would require that each state have weapons sufficient to survive an initial attack by *all* potential rivals and still be able to devastate the countries of *all* attackers. It would also require that the source of the attack be reliably identified. As noted earlier, this may prove difficult given likely limitations on these states' ability to

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<sup>93</sup> In the mid-1960s, French President Charles de Gaulle famously questioned whether the United States would be willing to "trade" the destruction of New York for the security of Hamburg in a conflict with the Soviet Union. Middle Eastern leaders would likely have similar concerns. Robbin F. Laird, *The French Strategic Dilemma* (Center for Naval Analyses, 1984), p. 2. The question posed by de Gaulle is at the heart of all extended deterrence relationships. Yet there are cases where extended deterrence appears to have worked, to include U.S. guarantees to non-nuclear NATO states, Japan, and the Republic of Korea. In other words, of course those questions would arise, but they are not necessarily insurmountable.

**A decapitation strike could preclude an “assured destruction” retaliatory strike even if sufficient weapons survive to execute one.**

field advanced early warning systems. For example, would Israel be able to determine with confidence the owner of a ballistic missile launched from a location along the Iranian-Turkish border? The origin of any cruise missile launched from a sea-based platform? Even assuming a state could identify the source (or sources) of an attack, could its command and control systems survive the attack sufficiently intact to execute a retaliatory strike? A decapitation strike could preclude an “assured destruction” retaliatory strike even if sufficient weapons survive to execute one.

This, in turn, raises the possibility of a “catalytic” war—one that is initiated between two states by a third party. Given a proliferated Middle East as described above, the chances that a regime would incorrectly attribute the source of an attack cannot be easily dismissed. To the extent cyber weapons can introduce false information into a state’s decision-making process, the risks of catalytic war only increase.

Further complicating matters, the early warning requirement following a proliferation cascade could be multidirectional, and at some point perhaps 360 degrees, especially if nuclear rivals begin deploying a portion of their nuclear forces at sea. Early warning requirements would be stressed even further (and the costs of such a system increase correspondingly) if a neighboring state (e.g., Iran in the case of Turkey or Iraq; Turkey in the case of Israel; etc.) were to acquire nuclear weapons. In this case warning times would be even more compressed than in an Israeli-Iranian competition. Owing to its proximity to Iran, Saudi Arabia, for example, could have less than five minutes to react to an Iranian ballistic missile attack no matter how advanced its early warning and command and control systems are.

As noted earlier in this assessment, regardless of what assumptions are made regarding a regional nuclear power’s early warning system, given the short ballistic missile flight times it seems likely that preserving command and control of the state’s nuclear forces while under attack will prove challenging. States might be tempted to adopt a launch-on-warning posture, but this requires both early warning and a highly responsive command and control system. Should a state determine that it will not be able to launch-on-warning and instead attempt to “ride-out” a nuclear first strike and retaliate, it would still need its command and control system to function effectively in the wake of the nuclear attack. Absent a highly resilient command and control system, a state’s ability to launch a retaliatory nuclear strike may require nuclear release authority to be diffused to lower-level commanders. But again, absent an effective early warning system it may not be possible to determine the attack source with confidence in a region with multiple nuclear powers.

Finally, a state could forego a prompt counterstrike in favor of responding days or even weeks following an attack. In theory there is no reason why a nuclear counterstrike would have to be prompt if it were focused solely on punishing the attacker through strikes on counter-value targets. Following this line of reasoning a regime could hide its nuclear weapons and launchers, recover them over time

following an attack, and launch its retaliatory blow once its surviving nuclear forces had been mobilized.

While this “buried bomb” posture might be appealing in the abstract, there are significant potential drawbacks that must be addressed. First, the country adopting this posture would have to be able to identify the source of the attack. Second, depending upon the attacker’s nuclear arsenal, a time delay may enable a follow-on strike. Third, there would always be a risk that the buried bombs would be located and destroyed in the initial attack or in the follow-on strike. Fourth, the nuclear weapons might even be physically seized by the attacker’s conventional or special operations forces following the first strike during what would almost certainly be a period of widespread disorder in the state that had been attacked. Fifth, a coherent command and control system would need to be maintained, not only during the minutes or hours immediately following an attack, but also for days or weeks. Failing that, the state’s leadership would likely have to devolve nuclear release authority to lower commands. While this could enhance the prospects of a successful buried bomb retaliatory strike, it would almost certainly increase the risks of an unauthorized or accidental use of nuclear weapons.

### Investment Priorities

The prospective Middle East nuclear states mentioned above have not elaborated a doctrine for their nuclear forces in the event they acquire them. It is therefore not possible to get a clear sense of their investment priorities should they cross the nuclear threshold. That said, it seems highly probable that any state that develops or acquires a nuclear capability will seek to minimize its exposure to destruction in a first strike. Among the options they might pursue toward this end are:

- Increasing the number of nuclear weapons in its arsenal, along with associated delivery systems to complicate an attacker’s targeting problem;
- Fielding an early warning system and command and control system that could enable a launch-on-warning posture or a launch-under-attack posture;<sup>94</sup>
- Enhancing the survivability of its nuclear forces by hardening its nuclear weapons and delivery systems (e.g., putting its missiles in silos); placing its missiles on mobile launchers; creating a nuclear-armed seaborne (or, with submarines, or a clandestine seaborne) force; and dispersing and burying its nuclear weapons to ride out an attack and launch a retaliatory strike;
- Fielding missile and air defenses to complicate an attacker’s targeting problem; or
- Some combination of the above.

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<sup>94</sup> Again it is not clear that such a system could function effectively in a situation in which the time from launch to strike is less than ten minutes.

While it is impossible to predict with any degree of precision what form a state's nuclear force posture might take, it seems reasonable to assume that there could be a strong incentive for new nuclear powers to continue doing what newly minted nuclear powers have historically done: build nuclear weapons and mate them with delivery systems. Aside from the fact that these tasks would already have been mastered, there may also be strong bureaucratic pressure to continue investing in nuclear weapons and delivery systems from the organizations that exist to produce them. At the same time there may be little institutional pressure for investment in early warning systems or creating a missile defense forces, as no comparable organizations would have been established to promote their production.

Perhaps most important, these other options (with the possible exception of hiding the weapons) are comparatively—and perhaps prohibitively—expensive in terms of human, technical, and material resources absent substantial technical and financial support from a major power. Moreover, warhead development and production costs typically only consume 10-15 percent of the total cost of the delivery system.<sup>95</sup> Taken together, these considerations suggest that new nuclear powers are likely to invest in the expansion of their nuclear arsenals over enhancements to their survivability.

## Planning Scenarios

As noted earlier in this assessment, should widespread nuclear proliferation occur in the Middle East in the immediate aftermath of Iran's acquiring a nuclear weapons capability, sustaining regional stability and avoiding the use of nuclear weapons would clearly become a far more challenging proposition. Yet these objectives would also take on much greater urgency. In addition to tremendous loss of life, the use of one or more nuclear weapons could result in severe damage to or destruction of the region's energy production capacity, threatening the global economy and, by extension, political instability. Nuclear weapons use could undo the "taboo" or tradition of non-use that has existed since August 1945, reducing the barriers to their use in other conflicts. It could also undermine the U.S. advantage in conventional warfare, from which it has benefited greatly in four major regional wars since 1950, and which it has leveraged to preserve an international order that has facilitated economic globalization and its substantial benefits.

In order to minimize the prospects of nuclear use, it is useful to identify a set of plausible circumstances under which it might occur with an eye toward taking steps to forestall such an event, or to address it effectively if preventive measures

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<sup>95</sup> P.S. Brown, "Nuclear Weapon R&D and the Role of Nuclear Testing," *Energy and Technology Review*, Lawrence Livermore National Laboratory, September 1986, p. 7.

fail. This process is typically referred to as scenario-based planning.<sup>96</sup> This section offers some general observations regarding how one might approach scenario-based planning under conditions where the principal regional powers in the Middle East have nuclear forces.

Despite the experience provided by nearly seven decades of dealing with nuclear weapons, there is still a tendency to approach scenarios involving nuclear-armed states with an overly narrow focus, and to employ questionable assumptions, such as the misbelief that nuclear-armed states do not take “absurd risks.” There is a tendency to baseline assessments of the nuclear balance by relying heavily on a plausible worst-case scenario. This scenario can be described as a “bolt from the blue” attack by one nuclear power against another. Its virtue is that it enables the state being attacked to gain a sense of how well it can survive the most formidable attack that its rival can launch against it, both in terms of damage to its society and its nuclear forces. This scenario was employed often during the Cold War to determine whether the United States would retain an “assured destruction” capability against the Soviet Union following a surprise all-out attack on its nuclear forces.

But as the historical record has shown, achieving an assured destruction capability has not prevented a number of situations where nuclear weapons came uncomfortably close to being used. Put bluntly, preserving the capacity to inflict assured destruction is not the issue here, avoiding nuclear use is.

Despite considerable evidence to the contrary, a number of Cold War assessments of the nuclear balance also assumed that the opposing sides would act rationally, roughly along the lines suggested by game theory. This thinking persisted even though many theoretic models assumed both sides had full knowledge of the circumstances, that they both calculated the payoffs from their decision options similarly, and that their decisions would be executed as they intended. The historical evidence presented in this assessment indicates that these conditions cannot be assumed as given. Rather, the history of the Cold War is one in which neither of the two superpowers actively plotted a “bolt from the blue” attack on the other, even when the United States had a near monopoly of nuclear strike capability. Regardless, the two nuclear giants nearly did come to atomic blows on several occasions. These experiences suggest a number of scenarios meriting attention.

For example, during the period of near-U.S. nuclear monopoly in the late 1940s and early 1950s, a serious debate occurred in American defense circles as to whether a preventive nuclear war should be waged against the Soviet Union’s nascent nuclear capability. This contingency was raised earlier in this paper with

**As the historical record has shown, achieving an assured destruction capability has not prevented a number of situations where nuclear weapons came uncomfortably close to being used.**

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<sup>96</sup> See Peter Schwartz, *The Art of the Long View* (New York: Doubleday, 1991); and Kees van der Heiden, *Scenarios: The Art of Strategic Conversation* (West Sussex, England: John Wiley & Sons, Ltd., 2005). See also Andrew F. Krepinevich, *7 Deadly Scenarios* (New York: Bantam Books, 2009).

respect to Israel launching a preventive war against a newly nuclear-armed Iran, and should be included in any defense planner's scenario set. Moreover, one cannot discount the incentive a regional nuclear power may have to launch a preventive war in a proliferated Middle East. This could occur, for example, in a case where a state acts to prevent the formation of a powerful, hostile coalition of nuclear-armed states.

As discussed in Chapter 1, United States and the Soviet Union narrowly averted a nuclear war in both 1962 and 1983. One can imagine a nuclear-armed Iran seeking to offset its nuclear inferiority vis-à-vis Israel by positioning nuclear weapons in other countries, such as Lebanon or Syria. While Iran is not likely to lack for ballistic missiles capable of reaching Israel, deploying nuclear forces forward could provide political dividends in the form of extended deterrence to a client group that has been the victim of Israeli attacks in the past. Given Israel's strong tradition of preemptive action, one cannot discount the possibility that it would do what some U.S. military leaders advocated doing in 1962: launch an attack on the offending missiles.<sup>97</sup> Scenarios incorporating this aspect of the competition should not be discounted.

During the Cold War several false attack warnings occurred, such as in the United States in 1979 and the Soviet Union in 1983, owing to limitations on early warning systems and human error. These false alerts happened even though both superpowers had invested enormous sums in early warning and command and control systems, and had substantially greater warning time than would be the case in a proliferated Middle East. As discussed earlier in this assessment, geography as well as human, technical, and financial resource limitations are also likely to constrain a head of state's ability to exercise the kind of control over nuclear forces that his or her counterparts had during the Cold War. The advent of cyber weapons will only serve to erode confidence further. Add to this the prospect of a half dozen nuclear powers, all in close proximity, rather than the two relatively distant superpowers, and the challenge of maintaining control over the region's nuclear forces becomes more formidable still. Clearly any scenario-based planning would benefit from including scenarios examining this aspect of the competition.

There exists also the possibility that in the course of a Nuclear Great Game, nuclear-armed powers external to the region could generate a crisis in the region. Such a crisis occurred during the 1973 Yom Kippur War, when the Soviets threatened to intervene in the conflict. In response, the United States ordered its military forces, including its nuclear forces, to DEFCON-3. Fortunately, the crisis was resolved. A crisis involving external powers in a proliferated Middle East cannot be ruled out. Major powers that establish security relationships with re-

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<sup>97</sup> Of course, Iran might also deploy nuclear weapons on cruise missiles, making it far more difficult for the Israelis to detect and target them. The United States did not detect the Soviet nuclear-armed cruise missiles in Cuba during the 1962 crisis.

gional nuclear powers may find themselves much as the Great Powers of 1914 found themselves with respect to the Balkans crisis: unable to avoid a conflict that none of them sought. Or it may be that a crisis outside the region spills over into the Middle East. Consider, for example, a nuclear confrontation between India and Pakistan where the latter has deployed (or transferred) nuclear weapons to Saudi Arabia. New Delhi might well consider Saudi Arabia's arsenal as either under the control of or potentially available to Pakistan. Scenarios examining this aspect of the competition should be central to any broad assessment of a proliferated Middle East.

Aside from these possible scenarios, we know that at least on the U.S./NATO side of the competition, plans existed for the limited use of nuclear weapons in the event the Alliance faced defeat in a major European conventional war with the Soviet-led Warsaw Pact.<sup>98</sup> These plans ranged from a single nuclear detonation—a “shot across the bow”—to signal a willingness to escalate the conflict, to a substantial use of some of the Alliance's roughly seven thousand “tactical” nuclear weapons as a means of stopping the Soviet offensive in its tracks.<sup>99</sup>

Along these lines, it seems highly plausible that a major confrontation between Iran and another regional nuclear power could occur by design, due to miscalculation, or as a result of an Iranian proxy taking aggressive action beyond Tehran's control—a case of the “tail wagging the dog.” If a conflict ensued and one side appeared on the brink of losing, it could execute a latter-day “shot across the bow” of its adversary, or even engage in a significant but limited use of nuclear weapons to restore its position. Any assessment of the military balance in a proliferated Middle East would need to take such scenarios into account.

There were other worrisome scenarios that emerged during the Cold War involving accidental or unauthorized use, and catalytic war described earlier in this assessment. Motion pictures such as *Dr. Strangelove*, *The Bedford Incident*, and *Failsafe*, and books such as *On the Beach* brought such concerns to the public's attention following traumatic crises such as the Cuban Missile Crisis in 1962 and the Suez Crisis in 1956.

Scenarios in a proliferated Middle East should examine the prospects that all or part of the nuclear arsenal of a new nuclear-armed state could fall under the control of a non-governmental faction in the event of a state failure. Nuclear weapons might be used internally as part of a civil war between factions vying for power, against an external power attempting to back one faction over another, by

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<sup>98</sup> Norman Friedman, *The Fifty Year War* (Annapolis, MD: U.S. Naval Institute Press, 2007), pp. 284-86; and Marc Trachtenberg, *History and Strategy* (Princeton, NJ: Princeton University Press, 1991), pp. 264-65.

<sup>99</sup> See Glenn C. Buchan, *Future Roles of U.S. Nuclear Forces: Implications of U.S. Strategy* (Santa Monica, CA: RAND, 2003), p. 26.



a radical terrorist element either within the failed state or against targets abroad, or some combination of these.

Finally, a proliferated Middle East would be characterized by a geographically tight cluster of nuclear-armed states; a high level of mutual suspicion among these states; the likely absence of effective early warning systems; and the significant potential of cyber weapons to introduce false intelligence into the calculations of state leaders. This combination suggests the region would be a prime candidate for a catalytic nuclear war. A scenario (or perhaps a set of scenarios) should assess the prospects for such a conflict materializing.

To sum up, this assessment concludes that a proliferated Middle East will pose significantly greater challenges than did the Cold War in terms of sustaining the U.S. objective of preventing the use of nuclear weapons. The challenge is not simply one of maintaining an “assured destruction” capability for each state; indeed, this Cold War-era metric was of dubious utility then and of no utility in the multipolar regional competition posited here. Rather, a rich menu of scenarios must be examined to inform any U.S. strategy that seeks to maximize the prospects of preserving key national interests in this critical region.

## CONCLUSION

Contrary to the prevailing wisdom in some quarters that Cold War models of deterrence will apply, a Middle East in which two hostile competitor powers—in this case, Iran and Israel—have nuclear weapons promises to be highly unstable. In part, this may stem from each side’s lack of insight into how its competitor calculates cost, benefit, and risk, leaving the door open for miscalculation. Regardless, there exists a structural instability in the competition owing to the exceedingly short missile flight times between states in the region and the costs (both financial and technical) of fielding, maintaining, and operating effective early warning and command and control systems.

Instability is heightened further due to the prospect that a third party might seek to trigger a catalytic war between two other states. For example, firing ballistic or cruise missiles at one nuclear-armed state would be interpreted as an attack by its nuclear rival. Using cyber weapons to introduce false information into an early warning system may also be a means of triggering a catalytic war.

Should Iran acquire a nuclear capability, intense pressure among some other states in the region to pursue nuclear weapons will likely emerge. If the region is host to a Shi’a/Persian bomb and a Jewish/Israeli bomb, then pride and honor, to say nothing of security, may “require” a Turkish bomb and a Sunni Arab bomb. The result would almost certainly be a ratcheting up of regional instability. Powers external to the region will likely seek to influence the competition and improve their standing with key regional powers by offering key technologies and capabilities that could greatly compromise regional stability in an already turbulent environment.

Preventing a proliferated Middle East may be beyond the capabilities of the United States or the international community. Given the consequences of such an environment, however, all options for preventing this possibility should be thoroughly explored. At the same time, a hedging strategy must be developed that positions the United States and the international community to maximize the prospects of preserving both regional stability and the sixty-eight-year-old tradition of non-use of nuclear weapons. Toward this end, a rich menu of plausible scenarios should be examined to identify ways in which deterrence might fail and, correspondingly, possible options to strengthen the barriers to nuclear use.

## GLOSSARY

<b>ASW</b>	Anti-Submarine Warfare
<b>BMEWS</b>	Ballistic Missile Early Warning System
<b>CEP</b>	Circular Error Probable
<b>CIA</b>	Central Intelligence Agency
<b>DEFCON</b>	Defense Readiness Condition
<b>DEW Line</b>	Distant Early Warning Line
<b>EMP</b>	Electromagnetic Pulse
<b>EU</b>	European Union
<b>HF</b>	High Frequency
<b>IDF</b>	Israeli Defense Force
<b>KAL</b>	Korean Air Lines
<b>KGB</b>	Committee for State Security
<b>KT</b>	Kilotons
<b>MIRV</b>	Multiple Independently Targetable Reentry Vehicle
<b>NATO</b>	North Atlantic Treaty Organization
<b>NIE</b>	National Intelligence Estimate
<b>NNWS</b>	Non-Nuclear Weapon State
<b>NORAD</b>	North American Aerospace Defense Command
<b>NPT</b>	Non-Proliferation Treaty
<b>NWFZ</b>	Nuclear-Weapons-Free Zone
<b>PAVE</b>	Precision Avionics Vectoring Equipment
<b>PAWS</b>	Phased Array Warning System
<b>PGM</b>	Precision-Guided Munition
<b>RYAN</b>	Nuclear Missile Attack (Russian: Ракетно-ядерное нападение)

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<b>SALT</b>	Strategic Arms Limitation Talks
<b>SAM</b>	Surface-to-Air Missile
<b>SLBM</b>	Submarine-Launched Ballistic Missile
<b>SLCM</b>	Submarine-Launched Cruise Missile
<b>TEL</b>	Transporter Erector Launcher
<b>UAE</b>	United Arab Emirates
<b>UHF</b>	Ultra-High Frequency
<b>USSR</b>	Union of Soviet Socialist Republics
<b>WMDFZ</b>	Weapons of Mass Destruction Free Zone



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