

# The Next Arms Race

By

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With most of the world’s advanced economies now stuck in recession; Western support for defense cuts and nuclear disarmament increasing; and a new, major Asian power emerging at odds with its Asian-Pacific neighbors and America, it’s tempting to think our times are about to rhyme with a decade of similar woes – the disorderly ‘30s. Might we again be drifting towards some new form of mortal national combat? Or will our future more likely ape the near half-century that defined the Cold War – a period in which tensions between competing states were high but peace mostly prevailed by dint of nuclear mutual fear and loathing?

The short answer is nobody knows. This much, however, is clear: The strategic military competitions of the next two decades will be unlike any the world has yet seen. Assuming US, Chinese, Russian, Israeli, Indian, French, British, and Pakistani strategic forces continue to be modernized and the U.S. and Russia limit theirs, the next arms race will be run by a far larger number of contestants with highly destructive strategic capabilities far more closely matched and capable of being quickly enlarged than in any other previous period in history.

## *Looking Backwards*

To grasp the dimensions of the new world we are moving toward, one need only compare how capable states were of destroying strategic targets instantaneously a half century ago with what damage they can inflict today. In 1961, Washington and Moscow engaged in the last and most significant Cold War confrontation over the status of Berlin. The U.S. had over 24,000 operationally deployed nuclear weapons. Russia had nearly 2,500. The other nuclear powers – Great Britain and France – had in aggregate no more than 50 (with France lacking any deployed nuclear weapons). The difference in the numbers of nuclear weapons deployed between the top and bottom nuclear powers – a figure equal to at least three orders of magnitude – was massive.

In contrast, today, the US has no more than 1,800 deployed nuclear weapons and Russia approximately 4,000. India, Pakistan, the UK, France, and Israel have one to three hundred and China may have anywhere between two hundred to more than a thousand. Putting aside North Korea’s nascent nuclear force (cf. France’s force of 1961), the difference in the numbers of nuclear deployments between the top and bottom nuclear powers, then, has fallen at least two full orders of magnitude and is projected to decline even further.

As tight as the nuclear deployments between states has become, the potential for this nuclear balance to shift quickly and dramatically is even greater; certainly far greater than was the case a half century ago. In 1961, the U.S., Russia, the UK and France had militarized nearly all of the nuclear weapons materials they had – they held little or nothing back in reserve. Nor could any of them militarize significant civil stockpiles of plutonium or highly enriched uranium, as none were then available.

Today, matters are quite different. First, the U.S. and Russia alone could start redeploying over 20,000 additional nuclear weapons that they have in reserve. Second, officials in Japan have publicly allowed that they have the technical capacity to militarize over 2,500 bombs' worth of "civilian" plutonium they have stored domestically. India, meanwhile, has roughly 1,000 bombs' worth of separated reactor-grade plutonium on tap and has claimed to have tested nuclear devices using this material. Third, China has tons of nuclear material that it either could or already has militarized and is planning on building a "civilian" plutonium reprocessing plant adjacent to one of its major military nuclear production plants that could produce 1,000 first-generation nuclear bombs' worth of plutonium annually. Finally, not just these states, but Pakistan, Germany, the Netherlands, Brazil, Iran, Argentina, North Korea, and South Africa either make or will soon produce such nuclear fuels while several other states have indicated a desire to do likewise.

In addition, the number of nuclear armed states has increased. Instead of the four we had in 1961 -- The US, Russia, the UK and France -- there now are nine, with Iran waiting in the wings and Turkey, Saudi Arabia, Algeria, South Korea, Syria, and Japan poised as possible mid-term additions. Unlike France, China, Russia, and the UK, though, these Post-Cold War nuclear weapons aspirants may not afford the world the courtesy of testing before deploying their first bomb. Instead, initially they are likely to develop "peaceful" nuclear energy programs, as Iran, India, Iraq, and North Korea did, and then move toward nuclear weapons only when they decide it is useful to do so. Whether or not "safety" and nuclear stability in this new world will be "the sturdy child of [mutual] terror" (Churchill's description of Cold War stability), remains to be seen. Certainly, the stool of nuclear deterrence in this world will have many more legs that could give way in many more surprising ways than were available a half century ago.

### *Why Worry*

An increasingly fashionable rejoinder to such broodings is to dismiss or downplay them in favor of a new, optimistic brand of nuclear realism. Any intelligent state, it's argued, knows that using nuclear weapons is militarily self-defeating and that these weapons' only legitimate mission is to deter military threats. Fretting about nuclear use and nuclear proliferation (vertical or horizontal), as such, is mistaken or overwrought.

But is it? Can states deter military threats with nuclear weapons if their actual use is self-defeating? What states, if any, actually believe they are militarily useless? The Russians and Pakistanis clearly don't. Just the opposite: They have gone out of their

way to develop battlefield nuclear weapons and to plan use them first to defeat opposing advanced conventional forces. As for the U.S., France, and the UK, all have studiously and repeatedly refused to renounce first use. Israel, meanwhile, insists that while it won't be first to introduce nuclear weapons in the Middle East, it also won't be second. This leaves North Korea – a wild card – and India and China, whose declared no first-use policies are now being challenged by military experts within their countries as being impractical.

But aren't the days of strategic mortal combat – of all-out industrial wars, nuclear or nonnuclear – behind us? Certainly, with the events surrounding 9/11, this view has gained the backing of many U.S. and allied military analysts and pundits. Reflecting this outlook, the U.S. and its European allies have turned several of their Cold War nuclear “survival” bunkers into historical tourist sites.

The problem is that a few still haven't. In Moscow's case, U.S. intelligence agencies have determined that Russia invested over \$6 billion to expand a 400-square mile underground nuclear complex at Yamantau a full decade *after* the Berlin Wall fell. American intelligence officials also claim that this complex is burrowed deep enough to withstand a nuclear attack and large enough and provisioned sufficiently to house 60,000 people for months. They believe it is one of a system of as many as 200 Russian nuclear bunkers. It's unclear why Russia has upgraded these underground centers.

China's nuclear passive defense activities are no less perplexing. In 2009, China's strategic missile command, the 2<sup>nd</sup> Artillery Brigade, revealed that it had completed 3,000 miles of dispersed, deep, underground tunnels for the deployment of its nuclear-capable cruise and ballistic missile forces. China spent enormous sums to build this system and is still expanding the complex. This system appears to be designed and provisioned to house thousands of military staff to be able to engage in a protracted nuclear exchange for weeks at a time.

North Korea, also has gone to extensive lengths to protect its strategic assets. Almost all of its nuclear and long-range military systems have underground, tunneled basing or host areas. U.S. intelligence agencies estimate that North Korea has in excess of 10,000 major tunnels to protect its key military and civilian assets.

### *Going Ballistic*

All of this suggests that several nuclear-armed states still believe they may have to endure major wars or attacks. Fortifying this suspicion is the growing ability to deliver both nuclear and non-nuclear payloads quickly against one another. Back in 1961, only the U.S. and Russia had nuclear-capable missile systems – i.e., cruise or ballistic missile systems capable of delivering a first-generation nuclear bomb at least 500 kilograms 300 kilometers or further. Now, at least 27 countries have perfected or acquired such systems and no fewer than 9 of these can launch a satellite into orbit (i.e., have accomplished what's prerequisite to develop intercontinental ballistic missiles). In addition, the U.S.,

China, Iran, South Korea, Israel and NATO forces more generally, are all working on precision missiles capable of achieving major results using only conventional munitions – i.e., of knocking out large military bases and major naval surface combatants. More nuclear-capable missile states are likely to emerge.

The strategic importance of these missile trends is difficult to exaggerate. First, it cannot help but increase the chances for war. One way to measure a state's diplomatic shadow or potential to influence others is simply to map out the range arcs of their deployed missiles. Today, increasingly, these range arcs overlap. Consider Iran. The reach of its missiles now intersects with that of missiles based in Israel, Egypt, UAE, Syria, Russia, Pakistan, France, Saudi Arabia, China, and the US.

This is a very different world than that of a half century ago. In 1961, when alliance loyalties within the Communist and Free World Blocs were at their height, only Russia's and America's missiles were aimed at each other. Now, there is no Communist Bloc, what remains of the Free World alliance system (e.g., NATO, ANZUS, etc.) is relatively weak, and nuclear-capable missiles in hotspots like the Persian Gulf could be fired from any number of states – both near and far away.

For nuclear armed states, this places a premium on securing nuclear weapons assets against surprise attack. It also raises first-order questions about nuclear escalation, which brings us to the second reason more missiles in more hands are a major worry – these missiles can act as conventional catalysts for nuclear war. Increasingly, with precision guidance and sub-munitions technologies, it is possible to destroy targets that once required nuclear weapons – e.g., large air strips and air fields, command centers, naval ports, moving surface ships – with a handful of conventionally-armed missiles instead. This has raised the prospect of a nation being able to knockout a significant portion of an opponent's key military forces *without* having to use nuclear weapons.

The good news is that this makes the initial use of nuclear weapons far less likely. The bad news is that with enough precision guidance capabilities, a state might be tempted to initiate combat in the expectation of winning without ever having to go nuclear and end up fatally miscalculating.

### *War Scenarios*

A real world case, now taken seriously by Pakistani security analysts, is the mid-term prospect of an Indian conventional missile decapitation strike against Pakistani strategic assets. The Indians, in this scenario, would use precise, offensive, long-range missiles against Pakistan's nuclear forces and command centers. Then, New Delhi could deter or fend off any Pakistani retaliatory nuclear strike with India's much larger nuclear forces and with Indian nonnuclear missile defenses. Finally, India would be able to prevail against Pakistani armor and artillery, with superior Indian military conventional forces.

To hedge against this prospect, Pakistan has already ramped up its nuclear weapons production and is now toying with deploying its nuclear weapons in ways designed to further complicate Indian opportunities to knock them out (e.g., delegation of launch authority under certain circumstances, forward deployment, dispersal, mobility, etc.). All of this only increases the prospects for nuclear use and has goaded India to develop nuclear ramp up options of its own.

Beyond this, advanced conventional weapons might ignite a nuclear conflict directly. Again, consider India and Pakistan. After being hit by so many Pakistani-backed terrorist attacks, the Indian government is now backing a conventional counter-strategy known as “Cold Start.” Under this approach, India would respond to Pakistan-backed terrorist attacks by quickly seizing a limited amount of Pakistani territory with Indian forces deployed to march on command immediately (i.e., from a “Cold Start”).

The idea here would be to threaten to take enough away from Pakistan that is dear (Islamabad’s desire to defend all of Pakistan), but not enough to prompt Pakistan to respond with its nuclear weapons. Unfortunately, Indian discussion of this Cold Start plan has had nearly the reverse effect. Shortly after India discussed this strategy, Pakistani military officials announced their intent to use tactical nuclear weapons against any invading Indian force and deployed new, short range nuclear armed tactical missiles along their border precisely for this purpose.

Unfortunately, this inclination to rely on nuclear weapons to counter conventional threats is not limited to South West Asia. Moscow, faced with advanced Chinese and NATO conventional forces, has chosen to increase its reliance on tactical nuclear weapons. For Russia, employing these weapons to counterbalance China and NATO’s conventional forces is far less stressful economically and is militarily pragmatic given Russia’s shrinking cohort of eligible military servicemen. China, in response, may toy with deploying nuclear artillery systems of its own.

### *China and the Arms Race Ahead*

All of these trends are worrisome. They also suggest what the next strategic arms race could look like.

First, as the U.S. and Russia try to reduce or contain their nuclear weapons deployments, other nuclear weapons states may be tempted to close the gap. In the short and mid-term, this would hardly include Pakistan, Israel, and India, though. For them, getting ahead of the superpowers would take great effort and at least one to three decades of continuous, flat-out military nuclear production. It’s quite clear, moreover, that none of these states have yet set out to meet or beat the US or Russia as a national goal.

China, however, is a different matter. It clearly sees the U.S. as a key military competitor in the Western Pacific and in North East Asia. It also has had border disputes with India and historically has been at odds militarily both with it and with Russia. It is not

surprising, then, that China has actively been modernizing its nuclear-capable missiles to target key U.S. and Indian military air and sea bases with advanced conventional munitions and is developing similar missiles to threaten U.S. carrier task forces on the open seas. In support of such operations, China is also modernizing its military space assets, which include military communications, command, surveillance, and imagery satellites and an emerging anti-satellite capability.

Then there is China's nuclear arsenal. For nearly 30 years most respected security analysts have estimated the number of deployed Chinese nuclear warheads to be between 150 and 400. Yet, by any account, China has produced enough weapons usable plutonium and uranium to make five or more times this number of weapons. Why, then, have Chinese nuclear deployments been judged to be so much lower?

First, there's China's declared nuclear weapons strategy. In its official military white paper of 2006 and in other forums, Chinese officials insist that Beijing would never be the first state to use nuclear weapons and would never threaten to use them against any nonnuclear weapons state. China also supports a doctrine that calls for a nuclear retaliatory response that is no more than what is "minimally" required and to use nuclear weapons only for its defense.

Most Western Chinese security experts have interpreted these statements to mean Beijing is only interested in holding a handful of opponents' cities at risk, which, in turn, has encouraged interpreting uncertainties regarding Chinese nuclear warhead deployments toward the low end.

What China's actual nuclear use policies might be, though, is open to debate. As one analyst recently noted, with America's first use of nuclear weapons against Japan in 1945, it is literally impossible for any country other than the U.S. to be first in using these weapons. More important, Chinese officials have emphasized that Taiwan is not an independent state and that under certain circumstances, it may be necessary to use nuclear weapons against this island "province." Finally, there are the not so veiled nuclear threats that senior Chinese generals have made against the United States if it should use conventional weapons against China in response to a Chinese attack against Taiwan (including the observation that the US would not be willing to risk Los Angeles to save Taipei).

The second cause for conservatism in assessing China's arsenal is the extent to which estimates of the number of China's warheads have been tied to the *observed* number of Chinese nuclear weapons missile launchers and, so far, the number of these systems that actually have been seen has been low. Few, if any, missile reloads, moreover, are assumed for each of these missile launchers and it is presumed that none of China's missiles have multiple warheads. Battlefield nuclear weapons, such as nuclear artillery, are also presumed to be low or nonexistent.

All of this may be sound but there are reasons to wonder. China, after all, says it has built 3,000 miles of tunnels to hide its missile force and related warheads and continues

to build such tunnels. Employing missile reloads for mobile missile systems has been standard practice for Russia and the U.S. It would be odd if it was not also a Chinese practice, particularly for its growing number of solid fueled rocket and cruise missile systems. There is also evidence that China may have or soon will have multiple warhead dispensers for some of its rockets. Finally, several experts believe China may be fielding 155 mm artillery to allow their use for the delivery of tactical nuclear shells.

Precisely how large is China's nuclear arsenal, then? The answer is unclear. What's not is the relevance of the answer. Several official Chinese sources suggest China may have deployed five to ten times the 150 to 400 nuclear weapons most analysts currently estimate China has. If this is so, China would have as many or more deployed warheads as the U.S. and nearly as many as Russia.

The first issue this possibility raises is how sound current U.S. and Russian nuclear modernization and missile defense plans are. Certainly, it hardly would be in Washington's or Moscow's interest to let Beijing believe it could operate more freely with Chinese conventional forces against Taiwanese, Japanese, American, Indian, or Russian interests in the belief that China's nuclear capabilities could deter Russia or the U.S. from responding.

Yet another question a much larger Chinese nuclear strategic force would raise is how it might impact Washington's and Moscow's current strategic arms negotiations. Might they be forced to factor China in? If so, how?

### *Interested Parties*

Japan would be another interested party. It already has nearly 2,500 weapons worth of separated plutonium on its soil that it was supposed to use to fuel its light water reactors and its fast reactors. Now, however, Japan has decided not to build more nuclear power reactors domestically. It also is reviewing the merits of continuing its fast reactor efforts, which were premised on Japan expanding its current domestic fleet of light water reactors.

A related and immediate operational question is whether or not Japan will bring a \$20 billion civilian nuclear spent fuel reprocessing plant capable of producing 1,000 bombs worth of plutonium a year at Rokkasho on line as planned in late 2012. This plant and Japan's plutonium recycling program have been controversial since they were decisions made under prime minister Nakasone and can be tied to internal Japanese considerations for developing a plutonium nuclear weapons option. Although this plant is not necessary for the management of Japan's spent fuel, the forward costs of operating it could run as high as \$100 billion over its lifetime.

In light of the questionable technical and economic benefits of operating Rokkasho, it would be difficult to for Tokyo to proceed *unless* it wanted to develop an option to build a large nuclear arsenal. What, then, would one have to make of a Japanese decision to

open Rokkasho if this decision came on the heels of news that China actually had many more nuclear weapons than previously believed?

South Korea, which has attempted to get its own nuclear weapons at least once and is asking the U.S. to back Seoul's efforts to separate "peaceful" plutonium from U.S.-origin spent fuel in Korea, is sure to be watching. After North Korea's sinking of the Cheonan and the bombardment of Yeonpyeong Island, South Korean officials have been calling for the redeployment of U.S. tactical nuclear weapons. This, however, is unlikely to happen. This raises the prospect of Seoul again trying to develop a nuclear weapons option of its own. South Korea already has its own nuclear-capable rockets and cruise missiles. How North Korea might react to South Korea developing an option to quickly make its own nuclear warheads is anyone's guess.

In addition to Japan and South Korea reacting negatively to news of a Chinese nuclear ramp up, there's India. It already has hedged its nuclear bets by laying down plans to build five unsafeguarded plutonium-producing breeder reactors by 2020. It too has roughly 1,000 bombs worth of separated plutonium it claims it can convert into nuclear weapons. It also has pushed development of a nuclear submarine, submarine ballistic missiles, missile defenses, long-range cruise missiles, and intercontinental ground-based ballistic missiles. India has never tried to compete with China weapon-for-weapon but if Chinese nuclear warhead numbers were to rise substantially, India might have no other choice but to try.

Pakistan, of course, will do its best to keep up with India. Since Islamabad is already producing as much plutonium and highly enriched uranium as it can, it would likely seek further technical assistance from China and financial help from its close ally, Saudi Arabia. Indeed, Islamabad may do this whether China or India build their nuclear arms up or not. There's also good reason to believe that Saudi Arabia might want to cooperate on nuclear weapons related activities with Pakistan to help it hedge against Iran's growing nuclear weapons capabilities.

### *Not So Peaceful Energy and Arms Control*

In this regard, Saudi Arabia has made it known that it intends to build up its "peaceful" nuclear energy capabilities. It recently announced that it would spend over \$300 billion to build 16 large power reactors in the kingdom before 2030. This would constitute one of the most lucrative, best financed near and mid-term nuclear power market in the world. It also could serve as the basis for development of a major nuclear weapons option. As Saudi Arabia's former head of intelligence recently told NATO ministers, the kingdom would have to get nuclear weapons if Iran did. Other news reports claim the kingdom is eager to work with Pakistan to secure such an option.

In this regard, Saudi Arabia is not alone. Turkey also announced an ambitious "peaceful" nuclear power program shortly after Iran's nuclear enrichment efforts were revealed in 2002. After Turkey failed in 2003 to secure NATO's protection against a possible

Iranian attack, the possibility of Ankara developing a nuclear weapons option (as it previously toyed with in the late 1970s) must be taken seriously. In addition, Algeria and Egypt (political rivals) and Syria (an ally of Iran) all have either attempted to develop nuclear weapons options or refuse to forswear making nuclear fuel, a process that can bring them within weeks of acquiring a bomb. Israel, meanwhile, continues to make nuclear weapons materials at Dimona, and all of these states have nuclear-capable missile systems of some sort.

Clearly, these trends, if continued, could spell trouble. How bad they might get, though, depends largely on what the U.S., Russia, China and other key states choose to do. The U.S. is focused on negotiating nuclear weapons reductions with Russia. New START is supposed to be followed by an agreement that will cover both strategic and theater nuclear arms in Europe. Given Russian concerns about U.S. and NATO missile defense efforts and advanced NATO conventional forces, though, it's unclear how soon a follow-on agreement to START might be reached.

Meanwhile, the Obama Administration is doing all it can to secure an international agreement to end the military production of fissile material for nuclear weapons. The prospects for finalizing such an agreement, though, are poor. Iran, Pakistan, North Korea, and Egypt all must consent to ratify it. Yet, they are unlikely to do so until Israel, India, the U.S. and South Korea take dramatic disarming steps.

Worse, the treaty's promotion risks complicating the establishment of effective fissile controls over nuclear fuel producing in states that do not yet have nuclear weapons. Under the proposed treaty, no controls would be placed over production of nuclear weapons usable fuels if they were committed to civilian purposes; the treaty would only ban military fissile production. Also, under the treaty, nuclear weapons states would be permitted to keep the weapons they already have along with any stockpiles of nuclear weapons usable materials they might have acquired.

The good news is that the states most constrained under the treaty would have little incentive to make more nuclear weapons materials covertly. This, in turn, could allow the treaty to have relatively relaxed forms of verification and be relatively effective even though there is no reliable way technically to fully account for past fissile material production or to detect and prevent the diversion of nuclear fuel production to military purposes in a reliable and timely manner. Unfortunately, nuclear fuel making states that currently lack nuclear weapons but may have a desire to make nuclear weapons covertly (e.g., Iran), could easily argue that their own declared nuclear fuel making activities should not be inspected any more tightly as those of the nuclear weapon states under the proposed treaty. This would set quite a bad precedent.

The US and allied governments are also trying to bring the Comprehensive Test Ban Treaty (CTBT) into force. In the U.S., it is unclear if the White House can muster the votes needed in the U.S. Senate to permit ratification. What is clear -- again -- is that bringing the treaty into force would also require ratification by India, Pakistan, China, Egypt, and North Korea and this is unlikely to happen soon.

Supporters of the CTBT claim that the U.S. has a general obligation under the Nuclear Nonproliferation Treaty (NPT) to ratify the CTBT. Yet, with A.Q. Khan's circulation of a proven, Chinese missile-deliverable warhead design to Libya, Iran, and Pakistan and the IAEA's public validation and sharing of a workable bomb design by Saddam, it is unlikely that banning nuclear testing will prevent non-weapons states from developing workable first-generation nuclear weapons. Instead, it seems more likely to make it more difficult for complying nuclear weapons states to upgrade their existing arsenals. This may be desirable but it has only an indirect connection, if any, to preventing further proliferation of nuclear weapons to new states.

Finally, the U.S. has tried to secure civilian and military facilities and stores of nuclear weapons usable materials against theft or sabotage and has tried to persuade nonweapons states not to make their own nuclear fuels. There's been some progress made in getting several states to surrender the highly enriched uranium they use to fuel their research reactors and to exchange it for less dangerous, low enriched uranium.

Getting other states to forgo making nuclear fuel, however, has been difficult. The United Arab Emirates has agreed to do so but Egypt, Turkey, Saudi Arabia, Vietnam and Jordan have all held back from making such a commitment. Iran, Brazil, Argentina, South Korea, and South Africa have all either begun to make their own nuclear fuel or are committed to doing so in the next few years. U.S. efforts to create an international fuel bank in Mongolia, meanwhile, have recently been rebuffed by the Mongolian government.

### *What to Do*

None of this is to argue that the U.S. must abandon its current nuclear control agenda. But it's clear that more will be needed to constrain what lies ahead. What else would help? Three things come to mind.

**1. *Take more concerted action alone, with our allies and friends, and with Russia to clarify and constrain China's offensive strategic military activities.*** In the first instance, this means clarifying precisely what strategic forces China has deployed and is building. Beijing's recent revelations that it has built 3,000 miles of deep tunnels to protect and hide its dual-capable missiles and related nuclear warhead systems more than suggests the desirability of reviewing our current estimates of Chinese nuclear-capable missile and nuclear weapons holdings. Are China's revelations about its tunnels disinformation meant simply to intimidate, or is China hiding more military assets than we currently assess it to have?

It also would be useful to know what China is planning to do to expand its existing forces. How much military fissile material does China currently have on hand? How likely is it that it has or will militarize or expand these holdings? How many missile reloads does China currently have and is planning to acquire? Have or will the Chinese

develop multiple warheads for its missiles? If so, for which missile types and in what numbers? How many nuclear and advanced conventional warheads is China deploying on its missiles, bombers, submarines and artillery? What are its plans for using these forces? How might these plans relate to China's emerging space, missile defense, and anti-satellite capabilities? All of these questions and more deserve review unilaterally, with our allies and, to the extent possible, in cooperation with the Chinese.

As this review is underway, it also would be helpful to game alternative war and crises scenarios relating to China's possible use of these forces at a senior political level in the U.S. and allied governments. Such gaming would likely impact allied arms control and U.S. and allied military planning. With regard to the later, a key focus would have to be how one might defend, deter, and limit the damage Chinese nuclear and nonnuclear missile systems would otherwise inflict against the U.S., its bases in the Western Pacific, America's friends and Russia. This could entail not only the further development and deployment of active missile defenses, but of better passive defenses (e.g., base hardening and improving the capacity to restore operations at bases after attacks) and possibly new offensive forces (e.g., more capable, long-range conventional strike systems) to help neutralize possible offensive Chinese operations.

Such gaming also should prompt a review our current arms control agenda. In specific, it should encourage discussion of the merits of initiating talks with China and Russia and other states about limiting ground based, dual-capable ballistic and cruise missiles. Unlike air and sea-based missiles, these ground-launched systems can be fired instantaneously and are easiest to command and control in protracted nuclear exchanges – ideal properties for employment in a first strike. These dual-capable missiles also can inflict strategic harm against major bases and naval operations conventionally.

Ronald Reagan referred to these weapons as “nuclear missiles” and looked forward to their eventual elimination. Toward this end, he concluded the Intermediate Nuclear Forces (INF) Treaty agreement, which eliminated an entire class of ground-based nuclear capable missiles, and negotiated the Missile Technology Control Regime (MTCR), which was designed to block the further proliferation of nuclear-capable systems (i.e., missiles capable of lifting 500 kilograms or more at least 300 kilometers). With the promotion of space-based missile defenses, he hoped to eliminate all such ground-based missiles.

What states have an incentive to eliminate these missiles? The U.S. has no intermediate ground launched missiles. It eliminated them under the INF Treaty. Most of its shorter range missiles are either air launched or below MTCR range-payload limits. As for its ground based ICBMs, they are all based in vulnerable fixed silos. Russia, on the other hand, has a large, road-mobile ICBM force. Yet, it too is worried about growing Chinese precision missile strike capabilities that it cannot defend against. India and Pakistan have ground launched ballistic missiles but some of their most seasoned military experts have recently called for the elimination of short-range missiles since these can only serve to escalate border disputes. As for China, it has much to gain by deploying more ground-launched missiles unless, of course, it causes India, Russia, and the U.S. to react. The U.S. has been developing hypersonic boost glide systems that could provide it with

prompt global strike options. It also has hundreds of silo-based ICBMs it could affordably convert to deliver conventional warheads precisely. None of this would be in China's interest.

Finally, although it may not be possible to conclude a fissile material cutoff treaty anytime soon, all of the other nuclear weapons state members of the United Nations Security Council should press China to follow their lead in unilaterally forswearing making fissile material for weapons. It also would be helpful to call for a limited moratorium on commercial reprocessing with China and as many other states as possible. The U.S. Blue Ribbon Panel on nuclear energy recently determined that it would not be in America's interest to pursue commercial reprocessing in the near or mid-term. Japan, meanwhile, is reviewing its own commercial reprocessing and fast reactor program given its decision to move away from nuclear power. South Korea wants to recycle plutonium but is having difficulty persuading the U.S. to grant it permission to do so with the many tons of U.S.-origin spent fuel South Korea has.

China is committed to having AREVA build it a commercial reprocessing plant that's nearly identical to the one Japan is now reconsidering opening late next year at Rokkasho. China wants to site its plant adjacent to a major nuclear military production facility at Jiayuguan. As already noted, these "peaceful," commercial reprocessing plants produce at least 1,000 bombs worth of nuclear weapons usable plutonium annually. Still, they are not technically necessary for the operation of nuclear power and are uneconomical compared to using fresh fuel and not recycling it.

***2. Encourage nuclear supplier states to condition the further export of civilian nuclear plants upon the recipient forswearing making nuclear fuel and opening their nuclear facilities to the latest, most intrusive, international nuclear inspection procedures.***

Besides moderating increased pressures on more states to develop nuclear weapons options of their own or to increase their existing nuclear arsenals, the U.S. and other nuclear supplier states need to do more to reduce the further spread of nuclear weapons in the Middle East. Here the worry is that Iran's pursuit of "peaceful" nuclear energy will serve as a model of sorts for Saudi Arabia (who wants to build 16 large power reactors before 2030), Turkey (20), Egypt (1), Algeria (3) and Syria (1). When asked, none of these countries has been willing to forgo making nuclear fuel. Nor have any of them ratified the IAEA's tough nuclear inspection regime under The Additional Protocol. Only the United Arab Emirates (UAE) has.

All of this is a worry since the IAEA cannot find covert enrichment or reprocessing or reactor plants with much confidence (cf. recent history regarding nuclear plants in Iran, Iraq, North Korea, and Syria). Also, once a large reactor is operating in a country, fresh enriched uranium is on tap that could be seized for possible further enrichment to weapons grade in a covert enrichment plant. In addition, plutonium-laden spent fuel is available that could be reprocessed to produce many bombs' worth of plutonium. Admittedly, one may not be able to verify pledges not to make nuclear fuel with high confidence but securing such a legal pledge, nonetheless, is valuable: It at least would put a violating country on the wrong side of international law.

Other than the U.S., though, no other nuclear supplier state (i.e., Russia, France, Japan, China, or South Korea) has yet to ask any of their prospective customers if they might agree to commit not to make nuclear fuel and to ratify the Additional Protocol. Worse, the U.S. itself is backing away from insisting on these conditions.

Some in the U.S. Congress want to change this by making it more difficult to finalize any future U.S. nuclear cooperative agreements with nonnuclear weapons states like Saudi Arabia, Jordan or Vietnam, unless they agree to the UAE nuclear cooperative conditions. These Congressmen know that the U.S. is paying France billions to supply the U.S. Department of Energy with a mixed oxide fuel fabrication plant. The U.S. has also made billions more in taxpayer backed federal energy loan guarantees available to French government owned nuclear firms to build commercial nuclear plants in the U.S. Russia, meanwhile, is also poised to request such loan guarantees for an enrichment plant it wants to build in the U.S. The U.S. affords defense security guarantees to South Korea and Japan and is extending civilian nuclear assistance to the Russians. All of this affords reasonable leverage to encourage these other nuclear suppliers to follow America's lead.

In any case, it would be useful to get as many of the key nuclear suppliers to agree to condition their nuclear exports along the same lines as the UAE agreement stipulates as possible. This could be done through the U.S. leveraging its influence. It could be done by making the case before the Nuclear Supplier Group. Neither approach is mutually exclusive. Finally, clarifying what kinds of military diversions the IAEA can reliably detect and what kinds of diversions the agency is unlikely to detect in a timely fashion would be helpful.

**3. *Do more to reduce states' access to surplus nuclear weapons and fissile material stockpiles that they could convert into bombs.*** As already noted, the U.S., and Russia maintain surplus nuclear weapons and nuclear weapons materials stockpiles and India, Israel, Pakistan, the PRC, Japan, France and the UK hold significant amounts of nuclear weapons usable plutonium and uranium. This fissile material overhang increases security uncertainties regarding what each nuclear weapons country may have or could deploy relatively quickly. Given the verification difficulties with the proposed fissile material cutoff treaty and the improbabilities of such a treaty being brought into force, it would be useful to consider alternative approaches.

One idea detailed by several analysts at different times is a voluntary initiative now known as the fissile material control initiative. It would call on nuclear weapons usable material producing states to set aside whatever fissile materials they have produced in excess of their immediate military or civilian requirements for either final disposition or internationally verified safe keeping. Russia and the U.S. have already agreed to dispose of 34 tons of weapons grade plutonium and Moscow has blended down 500 tons of weapons-grade uranium for resale as power reactor fuel. Much more can be done both between the U.S. and Russia and among the other fissile-producing states listed above. Encouraging as many states as possible to forgo recycling spent reactor fuel to produce plutonium-based reactor fuel also could be useful. Given that Germany, the UK, and the U.S. have essentially already made this decision for both the near and mid-term, and

Japan could easily justify doing likewise, much of a de-facto, international recycling moratorium is already in place. The U.S. and other like-minded nations should do more to formalize this reality.

*Conclusion: A Future Unlike Our Past*

It is easy to romanticize how stable the nuclear balance of nuclear terror between Russia and the U.S. was a half-century ago. That balance, on the other hand, nearly tipped into nuclear war in the case of Berlin and the Cuban Missile crises. It's just as easy to overplay the political, military, diplomatic and economic problems. 2011 is not 1937. In the late 1930s, war was increasingly seen as an economic imperative. Today, just the opposite is the case. Mutual deterrence, never all that strong or reliable during the height of the Cold War, will be less certain to prevail in places like South West Asia or the Middle East. On the other hand, long-term industrial wars between the U.S., Russia, or China seem difficult to imagine.

Far easier to complete, however, are wars between Pakistan and India; China and Taiwan; India and Vietnam. Increased diplomatic, political, economic and military competition between Beijing, Russia, India, the U.S., or Japan also seem likely. Equally worrisome is the further spread of nuclear weapons capabilities to the Middle East, North Africa, and Turkey and the further proliferation of nuclear-capable missiles.

In this more volatile world, the U.S. will need to pay more attention to competing and negotiating with China on strategic military matters. Washington should also do more to stabilize relations between Pakistan, India and China and to firm up U.S. alliance relations with Korea, Japan and other friends in the Pacific.

While the hope of eliminating nuclear weapons may continue, the US and like-minded states will need to do more to reduce the numbers and types of ground-launched nuclear capable missiles and the production of and access to nuclear weapons usable. Finally, far more will need to be done to restrict and condition the further spread of "peaceful" nuclear energy programs to new states lest the Middle and Far East be peppered with more Irans and North Koreas.

And if we fail to take these new, additional challenges on? At a minimum, nuclear weapons and first-strike missiles will spread and so increase the prospect of use. In the worst case, there will be wars that will go nuclear and ballistic. In this case, the 1930s and 1960s could end up looking quite benign.