

# Stemming the Spread of Missiles: Hits, Misses, and Hard Cases

- [Arms Control Today](#)

[By Aaron Karp](#)

Twenty-five years after it was publicly announced on April 16, 1987, the Missile Technology Control Regime (MTCR) has overcome uncertainty and hostility to become a major force in global nonproliferation. Supported by the 2002 Hague Code of Conduct Against Ballistic Missile Proliferation and the 2003 Proliferation Security Initiative (PSI), it is the principal mechanism of the international regime against the spread of long-range ballistic and cruise missiles and their technology.

In the late 1970s, news and intelligence reports revealed a rising tide of ballistic missile and space-launch projects, many coinciding with efforts to acquire nuclear capabilities. More than two dozen countries were moving into long-range rocketry. Many relied on Soviet-supplied Scud missiles, while others, such as Iraq and Libya, were acquiring rocketry technology from Europe. Persuaded of the need for multilateral coordination but initially suspicious of new treaties, the Reagan administration authorized the negotiations that eventually culminated in the MTCR.<sup>[1]</sup>

Like the earlier Nuclear Suppliers Group, the MTCR is not a treaty but an agreement to coordinate national export policies. The members agree to implement export controls based on the Technology Annex, which lists ballistic and cruise missile-related technologies, accepting an “unconditional strong presumption of denial” against exports of highly sensitive technologies and “exercis[ing] restraint” in approving export of others.<sup>[2]</sup> The MTCR has grown from seven original parties in 1987 to 34 with the acceptance of the latest in 2004, and several other countries unilaterally committed to abide by the rules but not formally join the regime. The Technology Annex—the heart of the regime—has been updated repeatedly, most importantly to cover any missile capable of delivering nuclear, biological, or chemical armaments.

Silver anniversaries are for celebration but also reappraisal. During the 25 years since the birth of the MTCR, the number of countries with active programs to develop long-range rockets (ballistic missiles and space-launch vehicles) has declined significantly, although the number investing in cruise missiles has grown. Acute worries today focus mostly on two emerging missile powers—Iran and North Korea—although this is partially because the MTCR members have accepted, to varying degrees, the missile capabilities that other emerging powers such as India and Pakistan refuse to abandon. Conventionally armed missiles also are much more of a priority today.

Through its intermittent plenary meetings and routine intersessionals, the MTCR has created a large network of national agencies directly engaged in the daily work of missile nonproliferation. Perhaps the greatest accomplishment of the MTCR and the broader missile nonproliferation regime is creation of a cultural expectation of nonproliferation. Many missile programs that previously seemed unstoppable are long gone, and survivors have been slowed sufficiently to permit neighboring countries to adjust to changing regional dynamics, especially the introduction of nuclear weapons and delivery systems. As a result, the international system is much less fragile than it seemed in the 1980s, when the possibility of a single country’s—virtually any country’s—dramatic advances in missilery threatened the stability of entire regions.

This restraint reflects much more than technical barriers. As rocket technology ages—this year also marks the 70th anniversary of the first flight of the German V-2—developing long-range missiles becomes simpler and cheaper due to electronic, component, and manufacturing improvements. As

technical barriers to entry continuously erode, normative and strategic considerations gain importance in efforts to suppress missile proliferation and its effects. Normative elements of the global ballistic missile regime are growing more important. Countries such as Argentina, Brazil, Libya, South Africa, South Korea, Taiwan, and Ukraine did not give up their long-range missile programs because the programs were technically unsupportable. On the contrary, several of those countries continue to develop space-launch capabilities. Instead, their retreat testifies to the powerful principle of missile nonproliferation.

### Hits and Misses

The MTCR never was intended to prevent countries from acquiring all types of missiles. Rather, it was crafted as a barrier to long-range military missilery. In the 1980s, there was growing fear that many countries would work incrementally, starting with sounding or artillery rockets and gradually accumulating self-sufficient capabilities to make much larger weapons. This has not happened.

The MTCR and the broader missile nonproliferation regime cannot take all the credit for the brightening international picture—the end of the Cold War and the decline of state-to-state conflict played major roles—but neither can the MTCR be denied credit for its contribution. Among its accomplishments:

Establishing the principle of missile nonproliferation for ballistic missiles. Most governments accept the principle that governments have an obligation to combat the spread of ballistic missile technology. This principle subsequently was codified in the Hague Code of Conduct, which was opened for signature in 2002 and now has been signed by 134 countries, all pledging not to aid ballistic missile proliferation.

Narrowing threat list. Few countries are interested in acquiring long-range rocketry. In the late 1980s, roughly a dozen countries were actively considering intercontinental ballistic missile (ICBM) development.<sup>[3]</sup> Today, there are four candidates: Iran and North Korea are in this category, as noted above; India is developing an introductory ICBM capability with the Agni-5, which has a range of about 5,000 kilometers; and Pakistan cannot be excluded

Reducing the number of countries trying to export destabilizing technology. When the MTCR was created, the worst offenders were Western European countries willing to supply larger booster engines to Saddam Hussein's Iraq. Now the remaining suppliers are North Korea and, to a lesser degree, Iran. China and Russia may continue to export ballistic missile technology, although neither appears to sell complete, large ballistic missiles (described below).

Eliminating most of the randomness of ballistic missile proliferation. Few countries are able to import major rocket technologies, and fewer are serious about ballistic missile development. Instead of the possibility that major rocketry projects could appear anywhere at any moment, the international community faces a handful of more-predictable priorities. The list of countries arousing concern has shrunk to a hard core of difficult cases, led by Iran and North Korea.

In place of the old game between proliferators and controllers, cooperation for nonproliferation became normal. More and more governments came to see ballistic missile control as an element in their broader strategic interests, and what used to be a strategic exception to other rules of cooperative restraint has become part of those same cooperative assumptions.

The MTCR became a potent incentive for any government interested in global acceptance, better relations with its neighbors and the West, easier high-tech trade, and security cooperation with the United States and its allies. The regime helped cement governments into the global security system. Because MTCR obligations control their most dangerous sales, exporters found their other technology sales easier to expand. Recipient countries found that nonproliferation adherence facilitates their imports of more-advanced technology, civilian and conventional military. This is export control at its best.

The great accomplishment against missile proliferation cannot be separated from larger transformations of international politics. Above all, the decline in state-to-state war made large

missile forces strategically dubious and their cost more difficult to justify. With less of a role to play, they became vulnerable to cutting and were stopped or were redirected toward peaceful purposes.

Unfortunately, the appraisal cannot end there. The MTCR was born with limitations. Even before it was announced, negotiators had given up on stopping the further spread of Soviet Scud missiles, which were in the hands of about a dozen countries in 1987. The rules were written to avoid confronting Scud capabilities, if only because Scud technology already was so widely available. Not surprisingly, Scud technology became the most difficult problem of missile proliferation, spreading to more countries and used in many armed conflicts since that time. There were other, more general shortcomings.

The regime's effectiveness against ballistic missile technology was not matched against cruise missiles. In contrast to the rising barriers against the ballistic missile trade, the barriers to cruise missile proliferation declined, eroded by simplification of the technology, the rise of new uses for it, and legitimation of cruise missiles by leading MTCR parties.

The MTCR failed to make ballistic missiles less important in strategic affairs. If anything, they gained importance in some countries. This is clearest in China and especially in Russia, where the ICBM and submarine-launched ballistic missile (SLBM) programs are the most favored of military procurement projects, lavished with financial support and public recognition while virtually all other military programs wither. Although Soviet/Russian-U.S. strategic arms reduction treaties prove that ballistic missiles are not weapons of the future, these weapons cannot be dismissed as relics of the past.

The MTCR has slowed but cannot halt countries that have no interest in joining international society. Reducing the breadth of the ballistic missile proliferation problem came at the cost of being left with the most challenging cases.

### **Trapped by Rising Expectations**

Even an inconspicuous security regime requires constant massaging to remain effective. Nothing happens by accident—not reaffirming first principles, getting intelligence where it is needed, continuously updating rules, or ensuring that governments act quickly. The day-to-day work of the MTCR requires deliberate effort by the foreign ministries of all 34 member countries.<sup>[4]</sup> Only the undiluted commitment of the parties makes it sustainable.

Behind this success lies active diplomacy by key governments. Although the MTCR rarely makes the news, its work affects vital multilateral issues of commerce and security and a complex skein of bilateral relationships.<sup>[5]</sup> If it did not exist, this cooperation would have to be re-created in a much more ad hoc and unsatisfying form. Inattentiveness is a constant danger.

The MTCR also suffers today from its own success. In the past, the basic test of the MTCR was relative effectiveness—how many programs could it stop or starve into immobility? Most of the countries at which it was directed quit the ballistic missile field, trimmed their ambitions, switched to peaceful uses, or persuaded the United States and its allies not to see them as threats and were dropped from the list of major targets.

It is tempting to dismiss past accomplishments as easy cases, but a careful reading shows that every success required concerted effort. Most missile control victories were anything but inevitable. Bringing countries into the regime often involved negotiations adapting MTCR standards to permit smaller missile projects, typically within MTCR thresholds, or allowing continued progress on civilian space launch projects. For example, Brazil joined in 1995 after winning access to U.S. technical assistance for its space launch program. South Korea joined in 2001 only after winning assurances it could proceed with MTCR-compliant ballistic missiles and larger space-launch boosters.<sup>[6]</sup>

Although criticized by purists, these deals were not exceptional nor were they concessions. Rather, they were essential to wider compliance. Deals do not undermine the regime; they are the basis of its expansion and success. Every new country that joins the MTCR brings change in the form of its own agenda and priorities. The great strength of the regime is its ability to accommodate this diversity while enhancing progress toward basic goals.

Sometimes, the trade-offs were judged unacceptable, most spectacularly in 2004 when the Bush administration vetoed Chinese membership. The Bush administration took this step partially because of residual distrust from Chinese transfers of ballistic missiles to Pakistan in the early 1990s and concern that even a reformed China would necessitate diluting MTCR standards.<sup>[7]</sup> An opportunity to bring in a major power was lost, as was a basic truth: making room for virtually every new member required adjusting the regime to accommodate its distinctive needs.

By adapting, the regime gained an extraordinary degree of control over government-to-government transfers of missile technology. Yet, with much of the original task done, the test of regime effectiveness shifts to outliers, the cases that eluded the MTCR throughout its past 25 years. Instead of being judged on its relative success, the regime now is evaluated in terms of absolute standards. Above all, can it stop or slow Iran and North Korea? If those countries continue, can the regime stop their neighbors from responding in kind?

### Enigmas in Iran and North Korea

At the heart of contemporary proliferation worries are not the most advanced countries feared in 1987, but technological laggards, distinguished by their isolation and truculence. Iran and North Korea are on the road to creating nuclear-armed ballistic missiles. Although their rocketry programs originated before the creation of the MTCR, these programs continue to be veiled in obscurity.

A series of reports in the last year showed that the process of missile proliferation still is not understood as well as one might think. Enormous ambiguities surround the ballistic missiles and space launch vehicles of both countries, revealing important gaps in outside knowledge and ability to enforce export controls. These uncertainties go to the heart of MTCR effectiveness.

North Korea's rocketry program emerged as the missile counterpart to the Abdul Qadeer Khan network, supplying launchers to complement the nuclear wherewithal exported with abandon by the former head of Pakistan's nuclear weapons program. North Korea is widely acknowledged to be the world's most important international source of short- and medium-range ballistic missiles, especially Scud versions and Nodongs supplied to Iran and Pakistan. Even so, an assessment of public intelligence reports led one analyst, Joshua Pollack, to conclude that North Korean missile exports have declined dramatically since the early 1990s. Export controls, especially the PSI, are important, but Pollack concludes that declining demand is a bigger factor: there are fewer buyers for North Korean rockets.<sup>[8]</sup>

The state of North Korean progress is highly controversial, culminating in the recent debates over whether North Korea will deploy a mobile ICBM in the next five years. Pyongyang has tested delivery systems with ICBM potential and launched a space launch vehicle, but without success, leading analysts such as David Wright to regard alarmist claims skeptically.<sup>[9]</sup>

No less surprising, previous assumptions about the source of North Korean missile technology have come under question. For many years, it was widely believed that North Korea's rocketry was largely indigenous, based on Scud technology acquired through Egypt around 1980 and progressively developed to create the Nodong and more-capable systems such as the Taepo Dong-1 and -2. This conclusion was shaken by the display in October 2010 of the Musudan, a ballistic missile apparently derived from the Soviet R-27 SLBM. A subsequent analysis shows that North Korean reliance on Russian missile supplies and technology extends to the Scuds and Nodong rockets it has exported (or re-exported) in recent years.<sup>[10]</sup> In light of these discoveries, MTCR compliance by Russia, a member since 1995, looks dubious or its law enforcement comical.

The allegations about North Korea's continuing dependence on Russia cast doubt on previous conclusions that Iran is largely self-sufficient. A recent UN report noted "conflicting views regarding the impact of sanctions on Iran's missile program." Indeed, Iran also appears to be dependent on foreign assistance.<sup>[11]</sup> U.S. diplomatic cables reveal allegations that Chinese-made rocket parts—graphite exhaust vanes—continued to reach Iran as of 2010, shipped through North Korea.<sup>[12]</sup>

After supplying short-range M-11 missiles to Pakistan in 1992-1993, Beijing appeared to recede from the global missile trade. In 2004, when it was being considered for MTCR membership, China went to great lengths to show it had reformed its export control policies. The Iranian exhaust vanes are small compared to whole rockets, but contradict this image. The transfers support the conclusion that Iran's ballistic missiles, despite distinctive designs, continue to rely on imported technology.<sup>[13]</sup> This view is contested. Uzi Rubin maintains that Iran's domestic infrastructure has reached a threshold beyond which export controls cannot stop its further progress.<sup>[14]</sup> Imports seem most significant, he suggests, as an accelerator rather than a determinant of progress.

These reports and analyses show that international trade remains important and inadequately controlled. Although Russia is an MTCR party and Chinese officials maintain that their country upholds international nonproliferation standards, both countries either allow exports of ostensibly forbidden technologies or are unable to enforce their laws.

### Dilemmas of Interconnectedness

The MTCR needs reinforcement, but even an airtight export regime would not solve missile proliferation. Never simple, the problem has grown in complexity. Testifying before the Senate Select Committee on Intelligence in January, U.S. Director of National Intelligence James Clapper noted that "it is the multiplicity and interconnectedness of potential threats—and the actors behind them—that constitute our biggest challenge."<sup>[15]</sup> As much as it transformed economics, globalization is transforming international security, making it impossible to separate dangers or isolate problems for special treatment. If policymakers focus on one technology, a synonym is certain to cause new trouble. Penalties imposed on one country surely will create problems with others. Interconnectedness weakens the effectiveness of single-purpose arms control regimes, making it more difficult for them to target particular programs or countries.

The interchangeability of ballistic and cruise missiles has long been recognized. Both are addressed in the MTCR, but cruise missile controls have been getting weaker. There are greater dual-use justifications for cruise missile technologies, including manned and unmanned aircraft. As less-risky versions of tactical aircraft, cruise missiles never have lacked for legitimacy. Beginning with the 1991 Persian Gulf War, they have become a stalwart of armed conflict. It is no wonder that missile diplomacy resists grappling with cruise missile issues. The Hague Code of Conduct, which forbids ballistic missile proliferation but not ownership, avoids cruise missiles altogether in its normative language. Dennis Gormley correctly calls this oversight "regrettable."<sup>[16]</sup> It is no mere slip; it acknowledges the seeming impossibility of restricting a technology that is so widely accepted.

Further complicating nonproliferation diplomacy is the rising tempo of missile defense deployments. Previously understood as alternatives, missile nonproliferation and missile defense apply to the same countries and threats. Although they are implemented by different agencies, address different points in the proliferation cycle, and differ radically in cost, they are directed at the same targets. They share pessimism over the prospects for cooperation with determined proliferators. There is uncertainty over the effectiveness of both; neither is a panacea. In this respect, missile nonproliferation and missile defense increasingly resemble each other. The future of missile proliferation cannot be understood without considering the interrelated effects of the MTCR and missile defense.

At the component level, many missile defense technologies are themselves subject to MTCR control.<sup>[17]</sup> More fundamentally, missile nonproliferation and missile defense affect each other operationally. The separation between the two has become increasingly arbitrary and unsustainable. When the U.S.-Soviet balance was paramount and everything else a sideshow, the division made sense. After President George W. Bush withdrew the United States from the Anti-Ballistic Missile (ABM) Treaty on June 13, 2002, the situation was altered forever. Bush tried to maintain the distinction by reassuring Moscow and emphasizing bilateral counterterrorism cooperation instead.<sup>[18]</sup> Instead, more cooperation is necessary in all areas.

Further muddying the distinction, missile defenses designed for one situation generally have the flexibility to be used in others. After the collapse of Bush's provocative central European ABM system, mercifully terminated by President Barack Obama in September 2009, the dominant

crossover concern is the replacement, U.S. missile defenses in the Mediterranean and southeastern Europe.<sup>[19]</sup> Unlike the previous system, which was designed to intercept ICBMs, the U.S.-NATO approach to missile defense initially will counter Iranian medium- and intermediate-range ballistic missile developments.<sup>[20]</sup>

Russian officials, including President Dmitry Medvedev, have maintained that the new system still would undermine Russian security. They have made U.S.-NATO missile defense the dominant issue of Russia's transatlantic diplomacy.<sup>[21]</sup> Their strenuous rhetoric elevated strategic policy to a prominence not seen since the Cold War. Missile proliferation has reversed older strategic relationships, as emerging missile threats, the traditional secondary priority, increasingly lead the agenda, forcing the U.S.-Russian relationship to adjust.

The same confusion affects other regions. Sea-based Standard Missile-3 (SM-3) missile defenses deployed primarily against Iran or North Korea are inherently capable against China's DF-21D, the missile seen as China's greatest deterrent to U.S. naval action in the eastern Pacific Ocean. The effectiveness of the SM-3 against the Chinese missile is unknowable in the absence of experience.<sup>[22]</sup> This uncertainty affects planning for both sides. China already has to consider the effectiveness of the U.S. Ground-Based Midcourse Defense (GMD) system, with interceptors at Fort Greely in Alaska and Vandenberg Air Force Base in California. Designed to counter a North Korean ICBM breakout, the GMD system is ideally located to intercept a Chinese attack. Chinese strategists therefore are considering expanding their deterrent forces to make them capable of larger salvos to saturate defenses. The GMD system undoubtedly plays a role in the gradual expansion of China's ICBM force, now numbering perhaps 72 missiles.<sup>[23]</sup> The absence of an all-out East Asian arms race testifies to Chinese and U.S. mutual restraint in the face of significant structural dangers.

The tendency to connect strategic and regional capabilities is further illustrated by the temptations of pre-emptive strikes. A statement of this trend is U.S. proposals to use ICBMs for prompt attacks on small targets, creating uncertainty about the possible targets of long-range rockets.<sup>[24]</sup> These innovations make the missile forces of the United States and other countries even more ambiguous and unpredictable. No longer can observers look on long-range missiles as they did 25 years ago, when they exclusively were weapons of strategic deterrence.

The rising salience of artillery rockets has broken precedents and inhibitions that previously restrained ballistic missile attacks. As artillery rockets grow larger—unguided rockets or guided versions with ranges up to 300 kilometers are increasingly common—they equal crucial performance capabilities of ballistic missiles. Some artillery rockets are in fact fully guided, such as the U.S. Multiple Launch Rocket System, making artillery rockets and ballistic missiles truly interchangeable. Missile defense already has had to adjust to this confusion.

A final element of this issue is the impact of short-range artillery rockets on strategic stability. Tactical weapons such as ubiquitous 107-millimeter Katyushas have become consequential in strategic balances. Hezbollah's estimated 200,000 rockets—some much larger than 107 millimeters—are part of the Iranian-Israeli strategic equation.<sup>[25]</sup> The new asymmetries go even further. Iranian rhetoric, for example, routinely suggests that alternative forms of violence, possibly suicide bombings, radiological attack, or effective closure of the Strait of Hormuz, can be used to deter ballistic missile attacks. Such interconnectedness is creating strategic problems that stretch far beyond the reach of the MTCR or any export control regime.

### **Toward Conflict Resolution**

Although regimes such as the MTCR must play crucial roles for years to come, they increasingly are understood as parts of an orchestra, working to support a larger diplomatic process to reduce tensions and promote conflict resolution. To be sure, the easiest way to advance missile nonproliferation in the next few years is by strengthening the MTCR, which means bringing in new members and improving enforcement by current ones. However, there are limits to what the MTCR can accomplish by itself.

Much can be done to improve the regime. Further membership growth is essential. No country has been admitted since Bulgaria in 2004. By failing to move forward, the MTCR has stagnated, losing its

relevance to the most serious proliferation risks and regions. In discussions of potential new members, the countries to stress are not just those that already adhere to MTCR restrictions, but also those most likely to help recipients such as Iran or North Korea. China is the most important potential member; India is the next priority. Others to be considered are Pakistan, countries of the Middle East, and eventually the most challenging countries such as Iran and North Korea.

The regime would be more credible if its Technology Annex were modernized to include long-overlooked issues, above all, cruise missiles. The reasons for avoiding cruise missiles are easy to appreciate. The most vigorous advocates of control are themselves increasingly dependent on cruise missiles and comparable precision-guided weapons, illustrated most recently by NATO's 2011 intervention in Libya and counterterrorism drone attacks elsewhere. As has always been the case, effective export control requires making nonproliferation a top priority, forgoing sales opportunities, and accepting self-restraint.

Developing the normative foundations of missile nonproliferation requires further progress as well. The Hague Code of Conduct approach, stigmatizing trade but not ownership, probably has run its course. Normative progress requires greater attention to the interconnectedness of all missiles. Normative processes are especially potent in eroding the prestige of ballistic missiles, making them less appealing. Nothing weakens that prestige so much as the sight of nuclear-weapon states destroying their own ballistic missile forces. It is no accident that the greatest milestones of missile nonproliferation came at the very moment the 1987 Intermediate-Range Nuclear Forces Treaty and the 1991 Strategic Arms Reduction Treaty were cutting superpower arsenals.

Yet, there are limits to the ability to resolve proliferation issues through norms, especially when the norms do not culminate in comprehensive bans. The normative consensus against chemical weapons or anti-personnel landmines—facilitating complete disarmament—is much weaker against missiles.<sup>[26]</sup> Stigmatizing ballistic missiles can reach only so far if security fears and symbolic appeal remain, while every use of cruise missiles makes their spread all the more likely.

The greatest value of missile nonproliferation is reducing tensions where it can and buying time where it cannot. That will remain the essential role of the MTCR. The solution to missile proliferation, to difficult cases, lies elsewhere, in policies that apply the time bought by export controls to resolve underlying conflicts. The ultimate answers to missile fears lie less in the distinctiveness of missile technologies and more in the all-encompassing principles of arms control and regional conflict resolution. Interconnectedness is not just a cause of security problems; it also is the basis of security solutions.

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