Missile Issues in South Asia

NAEEM AHMAD SALIK

Naeem Ahmad Salik is a Brigadier in the Pakistan Army, currently serving as the Director of the Arms Control and Disarmament Directorate at the Strategic Plans Division, Joint Staff Headquarters. He has taught in the Defense and Strategic Studies Department at Quaid-i-Azam University, Islmabad, and was a visiting fellow at the Henry L. Stimson Center in 1995. He has published extensively on the nuclear and ballistic missile programs of India and Pakistan.

For years, South Asia has been recognized as one of the world's most conflict-prone areas. Since the overt nuclearization of the region in May 1998, it has also been characterized as the most likely place for a nuclear conflict. The current military standoff between the two South Asian nuclear rivals, which cumulatively have deployed one million soldiers along their common border, has kept the international community on tenterhooks for the last six months.

The proliferation of missiles around the world, especially in some of the most volatile regions such as the Middle East and South Asia, has also been a major cause of concern for the international community. The fact that ballistic missiles are ideally suited for delivering weapons of mass destruction (WMD), and that major players in both these regions are known to possess WMD capabilities, has further accentuated the seriousness of the problem. Technology control regimes, in particular the Missile Technology Control Regime (MTCR), have succeeded only in slowing the pace of development of missiles but have failed to halt their spread to additional countries, mainly because of their selective application and duplicity of approach. Additionally, cruise missile technology, with its ever-growing potential, has largely been ignored as yet, while the tricky issue of space launch vehicle (SLV) technology, with its clear potential for conversion into military uses, has also yet to be resolved.

During the Cold War confrontation between the two superpowers, the approximately 30 minute flight time of intercontinental ballistic missiles (ICBMs) provided just enough time for decisionmakers on either side to confirm the veracity of warning signals of an impending missile strike and then make appropriate decisions to meet the threat. However, in South Asia, owing to the geographical contiguity of the two antagonists, a shorter-range missile would take only three to five minutes to reach its target, while medium-range missiles would take roughly ten minutes, leaving very little time for the decisionmakers to verify the accuracy of the warning and then to make a rational decision on how to respond to the threat. It is precisely for this reason that the introduction of missiles has accentuated the volatility of the regional security environment and is justifiably viewed as a destabilizing element. With both India and Pakistan now known to be nuclear capable states, these missiles, once fitted with nuclear warheads, can cause devastation in case of a launch based on a false warning, a misperceived warning signal, or an unauthorized use, because, unlike an aircraft, a missile, once launched, cannot be called back.

Compounding this danger, the two countries lack requisite surveillance and early warning assets, a deficiency that is not likely to be addressed, at least in the short term. The most serious problem, however, is that even if state-of-the-art surveillance means were available, they could detect only the launch of a missile but could not provide

information as to what kind of a warhead it is carrying. Obviously, basing its assessment on the worst-case scenario, the side at the receiving end will inevitably assume that any missile launched against it must be carrying a nuclear warhead. A response based on this assumption, therefore, could result in catastrophic consequences. This logic also leads to the conclusion that if rational decisionmaking is assumed on both sides, using conventionally armed ballistic missiles in a bilateral nuclear environment would not only be imprudent, it will also be highly improbable.

EVOLUTION OF THE INDIAN MISSILE PROGRAM

The Indian and Pakistani missile programs differ both in terms of their scope and their underlying motivations. The Indian missile program is a derivative of its civilian space program, which was initiated in 1967 and was sharply upgraded in 1970. The program had greatly benefited from generous technological assistance from advanced industrialized nations. As far back as 1974, the Director of the Indian Space Commission claimed that the country already possessed the ability to produce medium-range ballistic missiles (MRBMs) with locally produced solid fuels and guidance systems.[1] As noted by U.S. national security analyst Janne Nolan:

> Unlike the growth of its defense industry, the steady expansion of India's military space potential has occurred until recently without much active scrutiny from more advanced nations. Under the peaceful cast of civilian research, the nation had considerable latitude to acquire needed technologies and expertise through routine and unpublicized channels.[2]

In 1983, India embarked upon a dedicated military missile program through the initiation of an ambitious effort known as the Integrated Guided Missile Development Program (IGMDP). The program had the declared objective of developing five missile types: Nag, an anti-tank guided missile (ATGM); Trishul, a short-range surface-to-air missile (SAM); Akash, a medium-range SAM; Prithvi, a short-range battlefield support missile; and Agni, an MRBM.[3] The implementation of this program irrevocably put India on the path to becoming a major missile power, generating irresistible pressure for its main regional rival, Pakistan, to follow suit and thereby setting the stage for a potentially dangerous missile race in South Asia. This fact has been alluded to by a prominent U.S. analyst Rodney Jones, who has stated that:

> As with nuclear weapons capabilities, India has set the pace in the acquisition of missile delivery capabilities on the subcontinent. Pakistan invariably has come from behind, usually facing tougher procurement obstacles and the consequences of greater planning uncertainty.[4]

The first major manifestation of India's missile ambitions was the test firing of the medium-range Agni on May 22, 1989. This missile, with a range of 1500 kilometers (km) and a payload of 1000 kilograms (kg), was clearly a nuclear capable system.[5] True to their tradition, however, the Indians preferred to call it a "technology demonstrator." Bharat Warrianwala, an analyst at the Institute of Defense Studies and Analyses in New Delhi, aptly summed up this apparent contradiction, stating, "Like good Hindus and pacifists, we say the program is only for peaceful uses, but the 'Agni' is, in every sense, a system for nuclear weapons."[6]

Prior to this, in February 1988, India had tested its 150 km/1000 kg missile, the Prithvi, based on the Russian SA-2 missile. However, testing of this Pakistan-specific missile did not ruffle any feathers around the world. India then proceeded to conduct 15 more tests of the road-mobile Prithvi before inducting it into the 333 and 334 Missile Groups of the Indian army. Reportedly, the Indian army now has 75 Prithvis in its inventory. A longer-range version of the Prithvi with a range/payload configuration of 250 km/500 kg is undergoing trials for ultimate induction in the Indian air force. Yet another version of this missile is under development for installation on Indian Navy surface vessels. The missile, called Dhanush, with a reported range of 350 km, has already undergone two tests.[7] Once deployed, it will constitute a novel experiment, since naval surface platforms usually carry cruise rather than ballistic missiles for anti-ship or land attack missions. In view of its highly toxic liquid fuel, storage of the Dhanush on board ship will pose serious hazards for the crew. Interestingly, the significance of the Prithvi is generally underrated by security analysts around the world because of their lack of familiarity with the geostrategic situation prevailing in South Asia. Pakistan's geographical shape and its lack of strategic depth vis-à-vis India means that even this so-called short-range battlefield support missile has strategic connotations: from

launch sites in India, it can reach most of the strategic targets inside Pakistan, including the capital, Islamabad.

India tested longer-range versions of the Agni in April 1999 and again in January 2001.[8] These rail-mobile missiles are based on solid-fuel propulsion, unlike the first Agni, which had a solid-fueled first stage based on the U.S. Scout rocket and a liquid-fueled second stage based on the Prithvi. However, the mismatch between solid- and liquid-fuel propulsion caused the failure of two of its first three tests, before the program was frozen in the mid-1990s, ostensibly after intense U.S. pressure on the Narasimha Rao government. It appears logical that after the successful testing of the later version of the Agni, based on two solid-fueled stages, production of the original version is not likely to be pursued, other than maintaining the handful of those missiles that have already been built. On the eve of India's Republic Day and in the midst of a tense military standoff with Pakistan, India tested another version of the Agni, christened the Agni-1. This missile, with a range of 700 km and a payload of 1,000 kg, is both road- and rail-mobile and is based on a single solid stage. This time, the Indians did not take shelter behind semantics and openly termed it a Pakistan-specific missile.[9]

GROWING DIVERSITY OF INDIAN MISSILE CAPABILITY

India has recently introduced the cruise missile to the South Asian missile landscape—a major development. It has acquired and is in the process of installing the Russian-made Klub cruise missile system on its Kilo-class submarines, as well as on some of its surface vessels. This missile, with a range of 250-300 km, a payload of 450 kg, and solid-solid propulsion, moves at supersonic speed for last 20 km of its flight and can be launched from the existing 533 millemeter (mm) launch tubes of the Kilo-class submarines. The missile also has a land-attack variant. Besides the Russian navy, the Indian navy is the only other to be equipped with Klub missiles, which are capable of carrying nuclear warheads.[10] Through the induction of these missiles, India has already attained a degree of assured second-strike capability, at least for the near term. The system also provides India with an extended reach and power projection capability in the Indian Ocean region.

However, an even more serious development was the test firing of the joint Indo-Russian Brahmos missile, code named PJ-10, on June 12, 2001. According to reports appearing in Indian print and electronic media, the propulsion system of the missile was provided by the Russians—in clear violation of MTCR Category II guidelines—while the Indians contributed the "indigenously developed" guidance system.[11] The advertised range of this missile is 280 km and its payload capability is reportedly in the range of one-half metric ton—a range/payload capability just below the 500 kg/300 km threshold that triggers the strictest export controls under the MTCR. The specifications of the Brahmos will thus allow Russia to barely avoid U.S. sanctions, which Washington imposes against entities engaged in exports or imports of missiles over the 500 kg/300 km threshold to countries of proliferation concern. Pakistan has been the privileged "beneficiary" of such sanctions on a number of occasions, while India's indiscretions have always gone unchecked.[12] In any case, because this missile is capable of being launched from ground launchers, naval vessels, and aircraft, it has a stand-off capability to deliver a nuclear payload at long overall ranges, thereby making the issue of its inherent range irrelevant. On April 28, 2002, India carried out another test of the Brahmos cruise missile, indicating that the missile is rapidly progressing towards the serial production stage.

INDIGENOUS INDIAN MISSILE TECHNOLOGY: MYTH VERSUS REALITY

It is worth stressing that despite the pervasive myth assiduously cultivated by the Indians themselves regarding the indigenous nature of its missile program, New Delhi has openly boasted about the Russian collaboration in the development of Brahmos missile, touting it as a manifestation of the ever-expanding Indo-Russian relationship. According to Major General (Retired) Ashok Mehta, Brahmos is an improved version of Russia's Yakhont missile. In his words, "The fire-and-forget Mach-2 missile gives India a stand-off capability and strategic reach which can be extended beyond the present range of 280 kilometers." He went on to claim that, "the Brahmos exposes Pakistan's coastline and soft underbelly." The General also pointed out that, "…India is gradually moving away from a mere buyer-seller relationship to one of joint production, technology transfer, and exchange with Russian defense industry."[13]

In addition to introducing a qualitatively new element in the South Asian security equation, the missile also has overtones of "secondary proliferation" potential. Russian

Deputy Prime Minister Ilya Klebanov, who is in charge of defense industry, has stated that, "the Russian government was thrusting joint development, exploitation, and marketing of new weapons in line with the Indo-Russian Declaration on Strategic Partnership signed last year."[14] India's Minister of External Affairs and Defense Jaswant Singh has also described the development of the PJ-10 "as a landmark in technology partnership."[15]

It is also widely acknowledged, as noted above, that the Prithvi is a direct derivative of the Russian SA-2 missile, while the earlier version of the Agni encompassed both SA-2 (the liquid-fueled stage) and U.S. Scout rocket (the solid-fueled stage) technologies, as well as German software. Just last year, a German firm was indicted by a German court for having exported hydraulic cranes to India to be used for erecting the Agni launchers. Scout technology has also been used in both the solid-fueled single-stage Agni-1 and the solid-fueled two-stage Agni-2. A report published in the June10-16, 2002 issue of the Washington-based *Defense News* indicates that the Indians are dissatisfied with the performance of the Klub missiles, which, according to the reports, have fallen short of the intended range during trials. The Indians are, therefore, reportedly hunting in the international arms market for alternative cruise missile systems for installation on their submarines.

THE EVER INCREASING MOMENTUM OF THE INDIAN MISSILE PROGRAM

In the past two and one-half years, India has conducted a total of 26 missile tests of various types:

- Agni-II: 2 tests
- Prithvi II & III: 5 tests
- NAG (anti-tank): 3 tests
- Brahmos (PJ-10): 2 tests
- Akash (ATBM): 7 tests
- Trishul (SAM): 6 tests
- Agni-1: 1 test

A U.S. National Intelligence Estimate (NIE) released in January 2002 has pertinently commented on the objectives of the Indian missile program, stating that:

> New Delhi views the development, not just the possession, of nuclear capable ballistic missiles as the symbols of a world power and an important component of self reliance….Indian defense writers argue that possession of an ICBM is a key symbol in India's quest for recognition as a world power and useful in preventing diplomatic bullying by the United States.[16]

The report also notes that India could convert its Polar Satellite Launch Vehicle (PSLV) into an ICBM within a year or two. Shattering the myth of the "indigenous" character of the Indian missile program, the report clearly says that despite progress towards the achievement of self-reliance, "New Delhi still relies heavily on foreign assistance."[17] The president of India's ruling Bharatiya Janata Party (BJP), Jana Krishnamurthy, has also claimed that India was in the process of developing the Agni-III with a striking range of 5000 km, which will obviously herald India's entry into the ICBM field, a fact also corroborated by reports appearing in the Indian press.[18] A follow-on version, Surya-II, with a range of 12,000 km, is likely to be ready for testing by 2003.[19] It may also be pertinent to note here that after an earlier hiccup, India successfully tested its Geo-Synchronous Launch Vehicle (GSLV) in April 2001. It is widely accepted that a GSLV is readily convertible into an ICBM with requisite modifications.

These are ominous developments that carry repercussions far beyond Pakistan's security concerns. It may well be a matter of satisfaction for those who view India as a strategic counterweight to China that it will be able to reach the Chinese hinterland. The same missiles, however, with a slight change in direction and orientation could reach Europe on the one hand and countries such as Australia and all of the ASEAN region on the other—as well as regional allies of the United States both in the Middle East and Northeast Asia.

MOTIVATIONS UNDERLYING PAKISTAN'S MISSILE PROGRAM

Pakistan was first exposed to the menace of ballistic missiles during the Soviet occupation of Afghanistan in the 1980s. During the Afghan War, a large number of Scuds were fired across the Durand Line into Pakistani territory, ostensibly to strike the training camps and bases where Afghan mujahideen were being trained and equipped by U.S. specialists. Though the bombing remained limited to the tribal areas adjacent to the border with Afghanistan and targets deeper inside Pakistan were not hit, these generally inaccurate missiles did cause a number of civilian casualties. At nearly the same time, similar missiles were being used by the Iraqis against the cities and towns of neighboring Iran in what came to be known as the "war

of the cities." Then in 1988, India's first Prithvi test came as the final wake-up call for Pakistan.

Pakistan's missile program, like its nuclear program, is purely security-driven. Unlike India, Pakistan does not harbor any pretensions to the status of a regional or global power. Another compelling reason for Pakistan to embark upon the development of a missile capability of its own was the adverse impact of years of sanctions and denials on the conventional military balance vis-à-vis India, which prevented Pakistan from modernizing its advanced conventional capabilities. The impact has been most pronounced in terms of the ratio of air force platforms within the inventories of the two countries. Pakistan has, however, exercised the utmost restraint in the development of its missile program and has been following a policy of conducting the minimum number of tests consistent with the requirements for technical validation of its systems. Pakistan has made it clear that its missile capability is purely for defensive purposes and that it has no intention of using missile tests for political purposes.

CHRONOLOGY OF DEVELOPMENT OF PAKISTANI MISSILE PROGRAM

Worried over the developments taking place in its immediate neighborhood and conscious of the fact that the most reliable defense against ballistic missiles is the possession of a matching capability to deter their use, Pakistan embarked on its Ballistic Missile Development Program. In February 1989, Pakistan announced the testing of two of its short-range Hatf series missiles: the Hatf-I, a short-range solid-fueled missile with a range of 70-100 km and a payload of 500 kg, and the Hatf-II, with a similar payload but a designed range of 300 km. The Hatf-I, basically a free-flight rocket, was last tested in February 2000. In May 2002, Pakistan restarted its missile testing program with the test firing of an improved version of its liquid-fuelled MRBM, the Ghauri, also known as the Hatf-V. This was followed the next day by the first test firing of the solid-fuelled Ghaznavi, also known as the Hatf-III, with a range of 290 km. The series of tests culminated with the testing of a longer-range version of the Hatf-I, christened as the Abdali missiles two days later. This missile reportedly has a range of 180 km. According to the official pronouncements, the tests were extremely successful and validated all the parameters required to be tested. The tests were conducted in a transparent manner and prior notification was given to all neighboring countries, including India. The United States was also informed of the tests in advance.

Since April 1999, Pakistan has conducted a total of 6 missile tests[20]:

- Hatf-1: 70-100 km; 1 test (February 2000)
- Hatf-2/Abdali: 180 km; 1 test (May 28, 2002)
- Hatf-3/Ghaznavi: 280 km; 1 test (May 26, 2002)
- Hatf-4/Shaheen-1: 750 km; 1 test (April 14, 1999)
- Hatf-5/Ghauri: 1500km; 2 tests (April 14, 1999; May 25, 2002)

THE CHINA CONNECTION

A controversy has always dogged Pakistan's missile program with regard to alleged cooperation between Pakistan and China. Despite repeated assertions by both China and Pakistan that they have not conducted any missile-related interaction in violation of the MTCR, the issue has provided the anti-China and anti-Pakistan lobbies in the United States a convenient stick with which to beat both countries. Chinese government officials have reiterated on more than one occasion that they are abiding by the terms of their 1996 agreement with the United States with regard to curbs on the export of missile technology to countries like Pakistan and Iran, but the controversy refuses to go away.

However, the facts are quite different from perceptions. It may be of interest to mention here that Pakistan's Space Research Program pre-dates that of India's, although lack of requisite funding and the low priority given the program by successive Pakistani governments meant that progress was less than satisfactory. Nonetheless, in the early 1960s, long before Sino-Pak missile cooperation became a contentious issue between the United States and China on the one hand, and between the United States and Pakistan on the other, Pakistan had started experimenting with sounding rockets and weather satellites. These experiments were made possible through the bilateral cooperation extended by the United States under the auspices of the National Aeronautics and Space Administration (NASA), not only to Pakistan, but also to countries including Argentina, Brazil, and India. Similarly, France provided production capabilities for the Mammoth propulsion system to both India and Pakistan.[21]

In the 1980s, due to large-scale transfers, Russian Scuds proliferated around the world. In the 1990s, North Korea emerged as a new source of missiles and missile-related technology for many developing countries. Consequently, countries like Iraq, Libya, Iran, and North Korea affected modifications and developed modified versions of these missiles. The most significant effect of this widespread proliferation of Scuds was the easy access to information on missile designs.

The test firing of the liquid-fueled single-stage Hatf-V, also named Ghauri, on April 6, 1998, was a major breakthrough because this missile, with a range of 1500 km and a payload of 700 kg, provided Pakistan with a real deterrent against India's growing missile capability. An improved version of this missile was tested on April 14, 1999, in response to India's testing of its advanced Agni-II missile. This was followed by the first test firing on the following day of the solid-fuelled Hatf-IV, also known as the Shaheen-I, with a range of 750 km and a payload of 700 kg. A longer-range two-stage solid-fuelled Hatf-VI, also called the Shaheen-II, was unveiled during the Pakistan Day Parade on March 23, 2000. This missile, which is yet to be test fired, is likely to have a range of 2500 km with a 1000 kg payload.[22]

The Ghauri test in April 1998 should be seen against the backdrop of events in India, including the deployment of Prithvi missiles at Jullundur, close to the Pakistani border, in July 1997, and the announcement by the BJP of its election manifesto, which clearly outlined the objective of exercising the nuclear option and inducting nuclear weapons into the Indian arsenal.[23] Pakistan was, therefore, left with no choice but to respond to India's growing bellicosity by deciding to test fire its first IRBM. Ghauri's value was more than technological achievement. The symbolism of the name Ghauri went much farther into the history of the subcontinent, reviving the clash between a Muslim invader from Central Asia, Shahab-ud-Din Ghauri, who had fought and defeated a Hindu warrior, Prithvi Raj Chohan. It was, therefore, not only seen to be a befitting reply to Prithvi missiles but also to serve as a reminder to India that Pakistanis, when dared, are capable of responding effectively.[24] According to a 2002 U.S. National Intelligence Estimate:

> Since the 1980s, Pakistan has pursued development of an indigenous ballistic missile capability in an attempt to avoid reliance on any foreign entity for this key capability. Islamabad will continue with its present ballistic missile production goals until it has achieved a survivable, flexible force capable of striking a large number of targets throughout most of India.[25]

However, Pakistan does not see the need to match India missile for missile.

CONTROVERSY REGARDING FOREIGN ASSISTANCE

Many Western and Indian analysts allege that Pakistan's Ghauri missile is based on the North Korean Nodong and that the Shaheen-1 is a derivative of the Chinese M-9 missile. Responding to a question at Jane's Annual Ballistic Missiles Conference in London in October 2000, one of the foremost missile experts in the United Kingdom, Duncan Lennox, conceded that while the similarities may indicate that the design of the Pakistani systems may have been inspired by the aforementioned missiles, it does not definitively lead to the conclusion that the Ghauri and the Shaheen-1 are direct copies of the original North Korean or Chinese missiles, respectively.

Ironically, while Pakistan has been singled out and accused of benefiting from foreign sources of missile technology, it is conveniently forgotten that the U.S. and Soviet missile programs were established with the help of the German scientists who had worked on the V-1 and V-2 rockets during the Second World War. Since the abandonment of the Skybolt program in the early 1960s, moreover, Britain has been receiving first Polaris and then Trident missiles from the United States. Israel received Lance missiles from the United States, while French assistance in the 1960s helped Israel in producing the Jericho-1 missile.[26] It is also an open secret that the Arrow anti-ballistic missile (ABM) program has benefited from U.S. funding, as well as technology. Israel would now like to sell the Arrow to India.[27] Similarly, South Korea converted the American supplied Nike-Hercules SAM into a surface-to-surface missile.[28] It, therefore, defies logic that so much noise should be made about the alleged foreign sources of Pakistan's missile technology.

PAKISTANI EFFORTS TO AVERT A MISSILE RACE

Pakistan offered a "zero missiles zone" plan for the South Asian region as far back as 1993.[29] Since 1998, Pakistan has offered a comprehensive "strategic restraint regime" proposal, which, in addition to other measures, includes specific proposals for restraining missile programs.

Pakistani Foreign Secretary Inam-ul-Haq, in a January 2001 address to the Conference on Disarmament (CD) in Geneva, declared: "Instead of a triad of nuclear forces, Pakistan seeks a triad of peace, security, and progress." He went on to suggest a reciprocal arrangement with India:

- Not to deploy ballistic missiles;
- Not to operationally weaponize nuclear-capable missiles systems;
- To formalize the understanding on providing prior and adequate notification of flight tests of missiles; and
- To declare a moratorium on the development, acquisition, or deployment of ABM systems because of their potential to destabilize the minimum credible deterrence.[30]

Foreign Minister Abdul Sattar, in his statement at the CD on March 28, 2002, suggested the utilization of the CD forum for discussing the issue of missiles in all its aspects.[31] He proceeded to repeat the suggestions about missile restraints earlier made by the foreign secretary, including those pertaining to non-deployment and non-weaponization of ballistic missiles and formalization of the existing informal agreement on pre-notification of missile tests. In October 2001, speaking at the First Committee of the UN General Assembly, Ambassador Munir Akram had also argued for addressing the issue of missiles in a comprehensive and cooperative framework, responsive to the security concerns of all states.[32] India has, unfortunately, shown no inclination even to seriously consider these proposals. The Pakistani proposal to bring the missile issue for discussion at the CD forum is gradually gaining support, and even Russia has voiced its support for the idea, which from the Pakistani point of view, is a significant development.

THE ISSUE OF EXPORT OF MISSILES AND MISSILE TECHNOLOGY

There have been unfounded concerns, based on speculation, that Pakistan may become a source of proliferation of missile technology to the Muslim countries in the Middle East. Pakistan has not only vehemently denied any such intentions but has also proceeded to institute measures and put in place the necessary mechanisms to prevent such activity from happening. The existing Statutory Regulatory Orders have been reinforced by the issuance of new and more stringent regulations. Internal procedures have also been regulated and tightened, and systems have been put in place to oversee any interaction by Pakistani strategic organizations with foreign entities. In fact, a policy decision has been made effectively restricting all interactions to the government-to-government level, not allowing direct contact between lower level entities. A comprehensive ordinance to control the export of sensitive materials and technologies, including missile components and related technologies, is at an advanced stage of approval, heading for its final promulgation by the concerned government ministries.

Senior Pakistani leaders, including President Musharraf and the foreign minister, have reiterated in unequivocal terms on a number of occasions that Pakistan has no intention of exporting its nuclear or missile technology to any country whatsoever. In the case of Pakistan, unlike in most of the Western industrialized countries, the entities involved in the production of missiles are all in the public sector. It is, therefore, much simpler and easier to control and regulate their operations, including enforcement of export control regulations.

CONCLUSION

To date, the predominant approach towards containing or eliminating the scourge of missiles has been fundamentally flawed. The MTCR and other export control cartels have only partially succeeded in stemming the proliferation of missiles, especially in the most conflict-prone and volatile regions of the world. This failure can to some extent be attributed to the fact that some of the advanced industrialized countries have, in the blind pursuit of their economic and commercial interests, acted as major catalysts for proliferation of missiles and missile-related technology around the world. Moreover, unless the causes underlying the security concerns of nations actively engaged in ballistic missile development are identified and removed, the incentives for those countries will remain strong enough to motivate them to withstand hardships and sanctions of various kinds. In South Asia, as long as the festering Kashmir dispute remains unresolved, the stakes for the concerned states will remain too high to forego their nuclear or missile programs. Similarly in the Middle East, until a fair and equitable settlement of the disputes between Israel and its neighbors is firmly in place, incentives to pursue various weapons development, including the acquisition and development of ballistic missiles, will remain very strong.

In a world where missiles have become prime instruments of power projection by the major powers, why should others not cherish access to the same or comparable implements, even if only to deter any encroachment on their sovereignty? During the current military standoff between India and Pakistan, both countries tested a number of their respective missile systems. These tests were widely viewed as contributing to prevailing tensions. However, there was one silver lining in this otherwise grim and gloomy environment: despite the utter lack of normal communications and diplomatic exchanges, both sides still prenotified the other of their testing activities. One can only hope that once this crisis recedes and the two sides resume the process of negotiation, the discussion of nuclear and missile restraint and stabilization measures will be placed fairly high on the agenda. While one cannot foresee the elimination of missiles from the South Asian landscape, it can be fairly assumed that both sides will ultimately agree on some missile-related confidence-building measures, as well as other control/restraint mechanisms to alleviate to some degree the destabilizing potential of these military systems.

These regional efforts will have much better chances of success if the international efforts being pursued at various fora to curb the spreading menace of missiles make some positive headway. But this can only be expected to happen if an equitable, even-handed, and unbiased approach is adopted. The second key aspect in this regard would be the willingness of interested states to address and resolve the underlying security concerns that drive the missile ambitions of various countries. If, however, the rules are selectively applied, exemptions are made, or distinctions are introduced between privileged and the less privileged nations, no positive outcomes can be expected.

Another issue that is likely to bedevil missile control efforts is the rapidly developing potential of unmanned aerial vehicles (UAVs). These platforms are rapidly growing in sophistication, with enhanced ranges, payload capabilities, height ceilings, and speeds. The U.S. Air Force, for instance, is planning to equip the newly developed Predator B with the Low Cost Autonomous Attack System (LOCAAS), with smart munitions that would be capable of autonomously acquiring, tracking, and destroying critical mobile targets. Basically, there are many commonalities between UAV and cruise missile technology, and with the possibility of conversion of UAVs into cruise missiles and the growing lethality of cruise missiles, the proliferation of UAVs taking place without any constraints needs to be checked. India has acquired a number of Searcher-1 and -2 UAVs of Israeli origin[33] and has flown these on reconnaissance missions inside Pakistani territory. Highlighting the dangers that this type of missile proliferation portends is a June 2002 incident in which Pakistan air force fighters shot down one such platform near Lahore.[34]

[1] Onkar Marwah, "India's Nuclear and Space Program: Intent and Policy," *International Security* 2 (Fall 1977), p. 103.
[2] Janne E. Nolan, *Trappings of Power: Ballistic Missiles in the Third World* (Washington, DC: The Brookings Institution, 1990), p. 46.
[3] *Indian Defense Review Digest*, Vol. IV (New Delhi: Lancer Publications, 1992).
[4] Rodney W. Jones, "Pakistan's Nuclear Posture: Quest for Assured Nuclear Deterrence—A Conjecture," *Spotlight on Regional Affairs* 29 (January 2000), p. 10.
[5] "Indian Missile Launch Prompts Nuclear Fears," *The Independent* (London), May 23, 1989; Nolan, *Trappings of Power*, p. 45.
[6] Sheila Tef, "India's Homemade Missile Heats Up Arms Race," *The Christian Science Monitor*, May 4-10, 1989.
[7] Jane's Information Group, "Ranges and Current Status of Indian, Pakistani and Chinese Missile Programmes," January 2001, <http://www.janes.com/security/international_security/news/misc/bmp_010118_table.shtml>; see also Federation of American Scientist, "Indian Missile Programs," <http://www.fas.org/nuke/guide/india/missile/index.html>; and "Dhanush Missile Test-Fired," *Times of India*, September 21, 2001, <http://timesofIndia.indiatimes.com/articleshow.asp?art_id=1120181272>.
[8] Jane's Information Group, "Ranges and Current Status of Indian, Pakistani and Chinese Missile Programs."
[9] "Future Fire-The Shorter Smarter Agni Heralds a New Genre of Missiles Directed towards Pakistan," *India Today*, January 29, 2002; "India's Nuclear Forces, 2002," *Bulletin of the Atomic Scientists* (March/April 2002), <http://www.thebulletin.org/issues/nukenotes/ma02nukenote.html>; Admiral L. Ramdas, "The Challenge before India and Pakistan-Dialogue-an Imperative," February 26, 2002, <http://www.ieer.org/latest/ramdas2.html>; and Bharat Rakshak, "Agni-I MRBM," <http://www.bharat-rakshak.com/MISSILES/Agni-I.html>.
[10] Ashok K. Mehta, "India's Defense on Cruise Mode," *The Pioneer* (New Delhi), July 4, 2001.
[11] Ibid. The MTCR places the most stringent export controls on cruise and ballistic missiles that can carry a payload of 500 kg/300 km or more. These are designated Category I systems. Missiles with capabilities below this threshold are designated Category II missiles and are subject to more permissive export control standards.
[12] Douglas Barrie, "India, Russia Vow to Keep Missile Legal Under MTCR," *Defense News*, August 27-September 2, 2001.
[13] Mehta, "India's Defense on Cruise Mode."
[14] Vladimir Radyuhin, "India, Russia to Market Missiles," *The Hindu*, June 16, 2001.
[15] "The Missile Message," *The Hindu*, June 14, 2001.
[16] National Intelligence Council, "Foreign Missile Developments and the Ballistic Missile Threat Through 2015" (Unclassified Summary of a National Intelligence Estimate), December 2001, <http://www.fas.org/irp/nic/bmthreat-2015.htm>.
[17] Ibid.
[18] "India Developing Agni-III : Jana," *The Sentinel* (Guwahati), June 2, 2001.
[19] "India set for ICBM Test-Launch, Says Report," *The Hindu*, May 5, 2001.
[20] "Pakistan Tests Ballistic Missiles," *Jane's Missiles & Rockets*, June 21, 2002.
[21] Nolan, *Trappings of Power*, p. 43.
[22] Nasim Zehra, "Pakistan Has No Choice but to Bolster its Security," *Gulf*

News, April 16, 1999; *The News* (Islamabad), April 16, 1999 and March 25, 2000; see also Jones, "Pakistan's Nuclear Posture," pp. 13-14.

[23] *The Island* (Colombo), April 9, 1998.

[24] Nasim Zehra, "The Significance of Ghauri," *The News* (Islamabad), April 11, 1998.

[25] National Intelligence Council, "Foreign Missile Developments and the Ballistic Missile Threat Through 2015" (Unclassified Summary of a National Intelligence Estimate), December 2001, <http://www.fas.org/irp/nic/bmthreat-2015.htm>.

[26] Redstone Arsenal Historical Material, "Historical Summary of the Lance Missile System," <http://www.redstone.army.mil/history/lance/summary.html>;Nolan, *Trappings of Power*, pp. 27-8.

[27] Gordon Prather, "Selling Arrows to the Indians," *Washington Times*, July 30, 2002, p. 17; Peter Slavin and Bradley Graham, "Indian Arms Plan Worries State Department," *Washington Post*, 23 July 2002, p. 13.

[28] Nolan, *Trappings of Power*, pp. 27-8.

[29] Ambassador Maleeha Lodhi, "Testing Times in the Subcontinent," *The News* (Islamabad), April 12, 1998; see also paper presented by Director General Disarmament, Ministry of Foreign Affairs, at the News Trilateral Seminar, Islamabad, February 23, 2000.

[30] Pakistani Foreign Secretary, Inam-ul-Haq, address at the CD, Geneva, January 25, 2001.

[31] Statement by the Pakistani Foreign Minister Mr. Abdul Sattar at the CD, Geneva, March 28, 2002.

[32] Statement by Ambassador Munir Akram, Permanent Representative of Pakistan to the United Nations, Geneva, in the General Debate of the First Committee of the UN General Assembly, New York, October 17, 2001.

[33] *The Hindustan Times* (New Delhi), June 16, 2001.

[34] *The News* (Islamabad), June 7, 2002.