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ISRAEL LOOKS OVER THE HORIZON: RESPONDING TO THE THREATS OF WEAPONS PROLIFERATION

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Overview: The Changing Threat

The wave of Palestinian violence and terrorism that began at the end of September 2000 led to a widespread tendency to focus exclusively on Israeli-Palestinian political and security relationships. This narrow concentration of attention is potentially misleading and obscures the fundamental security threats that Israel is facing at the beginning of the twenty-first century. These threats come primarily from the wider Middle Eastern environment, extending from Libya and Egypt (and to a lesser degree, North Africa) to Iraq and Iran. Indeed, the Palestinian strategy is based, to a large degree, on widening the circle of conflict through escalation and regionalizing the confrontation. As a result, the importance of strategic deterrence, in response to revived coalitions and new military capabilities that threaten Israeli security, should be a basic factor in Israeli planning.

The focus on the Israeli-Palestinian conflict over the last eight months has tended to distract the attention of many observers from developments in the wider Middle East. But the view of the strategic planner is very different from that seen through the lens of the television cameras. From an Israeli perspective, the most dangerous threats come from a potential coalition of Arab states and Iran, rather than from the Palestinians alone. The fundamental territorial and demographic asymmetries have not changed in the past decades and, as previous Israeli chiefs-of-staff have repeatedly emphasized, "the main military element of instability in the Middle East military balance is this huge geopolitical gap between the standing armies of the Arab world and Israel."[1] These gaps have been reflected in situations in which Israeli forces were outnumbered by ratios of over 10 to 1 on specific fronts in past Arab-Israeli wars.[2] The proliferation of ballistic missiles and weapons of mass destruction provide an important additional dimension and a growing threat.

Even before the collapse of the "Oslo process" and the confrontation with the Palestinians, major elements in the military balance in the Middle East/Persian Gulf region were changing rapidly. These transformations reflect the combined impact of the end of the Cold War, the unresolved Iraqi threat, the failures of Arab/Israeli peace efforts (including Syria and Lebanon), growing Egyptian conventional capabilities, and, most importantly, the proliferation of ballistic missiles and weapons of mass destruction in the region.[3] The instability resulting from the changing balance of forces in the region has also increased the potential for

conventional conflict, and reinforced the importance of factors such as credibility in deterrence, defensive systems, strategic depth, and territory.

The Regional Strategic Balance

The threats created or enhanced by the proliferation of weapons of mass destruction (WMD) and missiles can be divided according to three general categories. The first category includes states that pose a major high-level threat in the immediate or near future -- specifically, Iran and Iraq. In the second category are states such as Syria and Libya whose WMD and missile capabilities are significant but are unlikely to develop or obtain nuclear capability within the next decade. The third category includes countries such as Egypt and Algeria whose capabilities are currently limited but which are expected to develop these weapons in the future. Each category poses different and difficult challenges.

Iraq

In terms of immediate and short-term threats, Iraq and Iran continue to be major sources of concern. In 1991, Iraq possessed a large arsenal of chemical and biological warheads, ballistic missiles, and an active nuclear weapons development program based on facilities that had not been reported to the International Atomic Energy Agency and placed under safeguards. As Richard Butler, the former Director of UNSCOM, has noted, despite over seven years of UN inspections under UNSCR 687 and a decade of sanctions, Saddam Hussein's regime developed a vast program of concealment to hold onto considerable capabilities.[4]

With the end of inspections in 1998, and the gradual disintegration of the sanctions regime, the evidence indicates that Iraq has begun to reconstitute its stockpiles and accelerate its nuclear weapons and ballistic missile development programs. The Iraqi regime has the motives, economic resources, trained weapons development teams (that remained intact and outside of UNSCOM's purview), and the ability to smuggle in key components necessary for these efforts. Under these circumstances, as well as based upon previous history and the Iraqi rejection of significant inspection, the new mechanisms, such as the United Nations Monitoring, Verification and Inspection Commission (UNMOVIC), established under UNSCR 1284, and the proposed "smart sanctions" policies,[5] are unlikely to succeed.

Saddam Hussein continues to focus on the acquisition of a nuclear weapons capability. As a number of analysts have noted, "Key nuclear-bomb components and weapons designs that were known to exist were never surrendered by Iraq to UN inspectors....Vital elements of Iraq's nuclear-weapons program remain in place today. Over 200 nuclear PhDs continue their work on unknown projects, with no supervision by UN inspectors for more than a year....Iraq operates a worldwide network to procure foreign technology."[6] These concerns have been confirmed by Richard Butler, who noted that "Iraq has recalled its nuclear weapons design team and has gathered them in one place where they can work again on that objective. Iraq knows how to make an atomic bomb."[7] Butler has warned that in the absence of scientific or technical barriers, Iraq could acquire the necessary raw materials to develop nuclear weapons within a year.

With respect to *chemical and biological weapons,* as a result of extensive Iraqi concealment,[8] 6,000 CW munitions may still be hidden.[9] In addition, many of the materials and facilities used for the manufacture of chemical and biological weapons remain intact. In 2000, U.S. officials reported that Iraq had begun to restore facilities that could expedite the production of chemical or biological weapons, and had converted a number of L-29 jet trainer aircraft for delivery of chemical or biological agents.[10] Given the history of military contacts between Iraq and Russia, and the continuation of these relationships, particularly as the sanctions regime

unravels, there is also increasing concern regarding the potential for the flow of chemical and biological agents from Russia to Iraq.[11]

In addition to air-based dispersal and delivery systems, the Iraqi ballistic missile program is also being strengthened. UNSCOM reports note that a number of Scud missiles, components, and launchers remaining from the 1991 war, as well as 500 tons of missile fuel, are still unaccounted for, and under the terms of the agreement reached at the time, Iraq was allowed to develop and produce 150 km range missiles. A number of such missiles were displayed in a parade that took place in Baghdad recently. Most importantly, by combining such short-range missiles, and scaling up the technology, Iraq has the ability to produce longer-range missiles again.

Finally, the Iraqi conventional threat, while greatly diminished by the 1991 Gulf War, cannot be ignored. Baghdad provided significant ground forces in the wars against Israel in 1948, 1967 (through Jordan), and 1973 (through Syria). At the end of 2000, in the context of the Palestinian wave of violence, Saddam Hussein moved as many as five divisions into Western Iraq, near the Jordanian and Syrian borders, and threatened to participate in another conflict. According to press reports, "the IDF Operations Directorate expects Iraq to get involved in any deterioration on the northern border and has made plans to deal with Saddam Hussein's forces."[12]

With the erosion of UN sanctions, the impact of a restored Iraqi army on conventional military coalitions and scenarios must be considered. According to recent reports, Iraq has received hundreds of new Russian-made tank transporters, enabling it to move armored forces quickly through Jordan and to the Israeli border.[13] The impact of Iraqi conventional forces will also depend on the pace of this modernization and the internal stability of Jordan, as a buffer to Iraqi intervention.

Iran

The war with Iraq in the 1980s demonstrated the importance of missiles and chemical weapons, and since then, Iran has sought to increase its military and deterrence capabilities vis-a-vis regional competitors and outside powers, including the U.S. The end of the UNSCOM inspection and verification regime in Iraq, and the resulting increase in the threat, accelerated Iranian WMD and missile development efforts. As Eisenstadt has noted, "Iran's non-conventional weapons programs are among the regime's top priorities, and Tehran continues to devote significant resources to acquiring such capabilities, despite severe economic constraints and efforts to reduce tensions with its neighbors and the West."[14]

In the past two years, Iran has made steady progress in its missile program, including three tests of the Shahab-3 missile with a range of 1,300 km. When it is deployed, it will be capable of striking Israel, Turkey, and American bases and installations throughout the region. The Shahab-4 missile is also in development, with a planned range of 2,000-2,500 km, and a 1,000 kg payload. It will be able to carry chemical, biological, and nuclear warheads, and would be able to hit targets in Europe. The expected time to operational capability is estimated to be from two to five years.[15] The test launch of the Taepo-Dong by North Korea on August 31, 1998, indicated that this technology would soon be available to Iran as well.

The Iranian missile program is based on materials and expertise acquired from North Korea, Russia, and China. The North Korean No-Dong missile (an updated version of the original Soviet Scud) provides the basis for the Shahab-3,[16] and many central components, including the motors, are imported by Iran from North Korea.[17] The Shahab-4 is reportedly based on the Soviet SS-4 and/or the North Korean Taepo-Dong.

In addition, Iran relies on substantial numbers of Russian scientists to develop its missile and WMD programs,[18] and China has also provided extensive assistance in the development of

missile production facilities, including special steel used for fabrication, the Semnan facility for solid fuel fabrication, guidance technology, and telemetry and related equipment used for missile testing and calibration.[19] The U.S. government's Rumsfeld Commission concluded that China "has carried out extensive transfers to Iran's solid-fueled ballistic missile program."[20]

In parallel with its missile programs, Iran is also acquiring nuclear technology, including major elements of an independent nuclear fuel cycle. The Bushehr power reactor complex (initiated by Germany in the 1970s and subsequently revived based on Russian technology) will provide a foundation for expertise and technology to be used to develop weapons.[21]

Iran is a Nuclear Non-Proliferation Treaty (NPT) signatory, but has not accepted the IAEA's enhanced safeguards framework. There are many questions regarding Iranian efforts to follow Iraq's example and hide a nuclear weapons program behind a "civil" facade. Imports of tritium gas from Russia (used primarily to enhance the explosive power of nuclear warheads),[22] and the efforts by Iran to acquire a heavy-water moderated research reactor,[23] and gas centrifuge and laser technology (both for uranium enrichment),[24] point to efforts to develop a nuclear weapons infrastructure.[25] In 1999, an Iranian student in Sweden was caught trying to acquire thyratrons (electronic devices used to detonate explosives that trigger nuclear implosion) for transport to Iran.[26]

Similarly, despite ratification of the Chemical Weapons Convention and a high profile in the activities of the Organization for the Prohibition of Chemical Weapons (OPCW), Iran is also widely believed to possess *chemical weapons,* and the U.S. Central Intelligence Agency (CIA) reports that Iran "has manufactured and stockpiled chemical weapons, including blister, blood, and choking agents."[27] General Tommy R. Franks, Commander-in-Chief of the U.S. Central Command (USCENTCOM), which has operational responsibility for the Persian Gulf region, told the House Armed Services Committee on March 29, 2001, that "Iran is the holder of the largest chemical weapons stockpile" in the area under his responsibility.[28]

In addition, the U.S. Arms Control and Disarmament Agency reported that "Iran probably has produced *biological warfare agents* and apparently has weaponized a small quantity of those agents."[29] Other sources report that "Western countries have noted attempts by Iranian representatives to buy, unofficially, technology and biological materials used specifically for the production of biological weapons, in particular mycotoxins."[30]

In February 1998, U.S. Deputy Assistant Secretary of State Robert Einhorn testified that Iran was obtaining "dual-use chemicals and production equipment" from China.[31] In April, the Iranian Defense Industry Organization took delivery from a Chinese corporation, the Tianjin branch of SinoChem, of 500 tons of phosphorus pentasulphide, a dual-use precursor on the Australia Group control list (used by Iraq to make VX nerve gas).[32]

In the longer term, Iran can be expected to make new efforts to modernize its conventional forces, as well. In this context, General Franks has noted that Iran can be expected to purchase "$6 to 7 billion over the next number of years worth of everything from enhanced air defense capability to enhanced air forces.[33] By the time these weapons systems are incorporated into the Iranian armed forces, Iran will be able to employ them under the non-conventional umbrella that it is presently constructing.

Thus, right now Iranian WMD and missile capability is increasing steadily, at a time when Iranian hostility to Israel continues unabated. As recently as June 5, 2001, Iranian Defense Minister Shamkhani declared, "Israel is an illegitimate regime."[34] While Israeli policy seeks to avoid confrontation with Iran in the hope that the internal political changes will lead to moderation and, thus, prevent the evolution of a direct threat relationship, the outcome of this process is uncertain.

Syria

In the aftermath of the 1991 Gulf War, Syria spent several billion dollars on modernizing its armored and mechanized forces, and can deploy considerable numbers of top-of-the-line main battle tanks. In 1996, Damascus moved a commando division from the Beirut area to the foot of Mount Hermon, seemingly poised for attack against Israel's main early-warning facilities in the area.

However, towards the end of the 1990s, Syria's resources for military modernization were reduced, and its conventional capabilities declined, both in terms of numbers and technology. Nevertheless, the potential cannot be discounted for a Syrian offensive on the Golan Heights (a "quick grab"), following an opening missile attack against Israeli air force and army reserve staging bases. Syria has been acquiring ballistic missiles as well as chemical weapons for decades, and the ability to use these weapons against both military (counterforce) and civilian targets (countervalue) is growing. There are also a number of reports that Syria has an ongoing biological weapons program that includes botulism and other toxic agents.[35] In terms of nuclear capabilities, Syria does not have an active and advanced program, but following the pattern in a number of other states in the Middle East and elsewhere, the Syrians have been slowly building a foundation in both missile and nuclear technology.

Syria's ballistic missile program has been developed through cooperation with and imports from North Korea and China, although agreements to acquire the more accurate Chinese M-9 missile have apparently been frozen, following American pressure on Beijing. The Syrian missile acquisition and development program appears to be closely linked to that of Iran, continuing cooperation in this area that began during the Iran-Iraq war.[36] In the past decade, the rate of development has accelerated, with progress in the area of liquid and solid propellant production capabilities, based on technology and assistance from North Korea, Russia, China, and in cooperation with Iran. In addition, Syria has begun to produce some missile parts, and has gained the ability to assemble liquid-fueled Scud C missiles.[37]

In September 2000, Syria tested a 700 km North Korean-made Scud D. As of the beginning of 2001, Syrian missile capabilities reportedly consisted of:[38]

- From 60 to 120 Scud-C missiles with a 500 km range and a 500 kg payload.
- Up to 400 Scud-B missiles with a 300 km range and a 1,000 kg payload (as well as 26 mobile launchers).
- An unknown number of Scud-D missiles (700 km range, less than 500 kg warhead).
- 200 SS-21 Scarab missiles with a 70 km range and a 480 kg payload (plus 18 mobile launchers).
- Development of independent production capability for M-9 missiles from China (600 km range; 500 kg payload).

Currently, the primary warheads for these missiles are believed to be chemical weapons, which Syria began to acquire in the early 1980s. Plants for the production of nerve gas and other chemical agents are believed to be operating near Damascus and Homs, and Syria is generally assumed to possess large supplies of mustard gas, sarin, and VX.[39] Delivery systems for these weapons vary, including modified Soviet cluster bombs, Scud missile warheads, and perhaps SS-21 missiles. Syria is also included in most lists of states possessing or seeking an offensive biological and toxic weapons capability, including anthrax and botulinum toxin.[40]

In terms of nuclear weapons, although the evidence indicates that Damascus wishes to keep this option open, this is a long-term prospect.[41] During the past decade, Syria has attempted to expand its infrastructure, through cooperation with China, Russia, and other countries. The Russian government has been seeking to expand its influence in the region through the export of sensitive and dual-use technologies (see the discussion of the Iranian case), and this process included the reestablishment of traditional ties between Moscow and Damascus.

A series of high level visits led to the negotiation of a cooperation agreement[42] that included construction of a 25-mw light water research reactor.[43]

Libya

Libya is a core member of the radical Arab rejectionist front, and "represents a perennial threat largely because of its overly hostile intentions."[44] To back up the hostile rhetoric and extensive state support for terrorism, Qadhafi has also sought WMD technology and missiles for a number of years. Although Libya lacks a basic foundation and infrastructure for the operation of advanced facilities, access to oil funds allows for the purchase of turn-key systems, such as chemical weapons production facilities and ballistic missiles, from Europe, Japan, and other advanced industrial states.

International attention was focused on Libyan production of chemical weapons through revelations surrounding the Rabta plant, built with extensive external assistance in the 1980s.[45] Although there have been reports of start-up problems, and of a fire that was claimed (by Libyan officials) to have caused considerable damage, such reports are often discounted.[46] According to reports, this plant can produce 1.2 metric tons of mustard and nerve gas daily. Feed stocks including thiodiglycol and nerve gas precursors have also been acquired in large amounts. In addition, a smaller CW production facility near Tripoli has been producing poison gas since 1987, and there are reports of another plant near Sabha, based on Chinese assistance. There were numerous reports regarding Libyan use of mustard gas in the war in Chad in 1986-87.[47]

Qadhafi has repeatedly restated Libya's desire to acquire nuclear weapons,[48] and has worked steadily to obtain material and technology from Pakistan, China,[49] the Soviet Union (now Russia), Argentina,[50] India, Pakistan,[51] and Belgium. In 1999, Tripoli and Moscow resumed discussions on "civil" nuclear cooperation and on construction of a potential power reactor which would provide a foundation for weapons development.[52]

In terms of delivery systems, Libya has possessed a number of short-range Scud-Bs purchased from the USSR, and one was launched against a NATO base in Lampedusa, Italy, in the early 1980s. Libya's ballistic missile procurement efforts have been similar to those of Iran and Syria, focusing primarily on imports from North Korea. Following the lifting of sanctions that were imposed following the terrorist bombing of Pan-Am Flight 103, a number of reports indicated that Libya was seeking to acquire extended-range, reduced-payload, Scud-type missiles.[53] In November 1999, British customs agents discovered a number of shipping containers with Scud missile components (labeled as automotive spares) at Gatwick Airport on a British Airways flight bound for Tripoli via Malta.[54] A few months later, another shipment of Scud parts being shipped from Taiwan to Libya was intercepted in Zurich.[55] In April 2000, the U.S. government disclosed that China had also provided missile technology to Libya,[56] and Iran is reportedly helping to build a liquid-fuel production facility in Libya.[57]

In addition, the Libyans have shown interest in producing longer-range (1,000 km) missiles using technology and components from North Korea (based on the No-Dong), and may already have obtained a number of complete missiles and launchers.[58] This would mark a formidable increase in Libyan abilities to launch attacks, not only in the region but against targets in Europe as well.

Egypt

Egypt continues to play a primary role in the Arab world, and has sought to maintain advanced military capabilities, including ballistic missiles, chemical and, to a lesser degree, biological weapons as well. The modernization of the Egyptian conventional capability

continues, based largely on American technology and billions of dollars in military assistance. As Hillel Frisch has recently noted, "Egypt's army has sacrificed neither quantity nor quality of its weapons systems, nor slashed military salaries severely, despite a seemingly shrinking budget."[59] As a result, Egypt's military has been transformed from a largely defensive force into an army with "an offensive orientation."[60] The 1979 Egyptian-Israeli peace treaty notwithstanding, major exercises, such as Badr-96 and Jabal Pharon (1998), reflect preparations to confront Israeli forces in the Sinai and beyond.[61]

While relying primarily on conventional capabilities, Egypt has not neglected WMD, and was the first country in the region to introduce and use chemical weapons, beginning with mustard gas employed in Yemen in the early 1960s. In addition to being able to produce mustard gas (based on the infrastructure provided by a large petrochemical industry), Egypt is also reportedly constructing production facilities for chemical weapons precursors (including nerve gas).[62]

Although Egypt is not generally considered to be among the states in the region which have developed biological weapons, there are some reports to the contrary.[63]

Egypt was the first Middle Eastern state to acquire Scud missiles and used them in combat during the 1973 Yom Kippur War. In the 1970s and 1980s, the Egyptian military worked actively to acquire ballistic missiles and related technologies, in cooperation with North Korea, as well as in the Condor program, in cooperation with Iraq. Egyptian missile capabilities reportedly include:

- 100+ SS-1 (Scud-B) missiles with a 300 km range and a 1,000 kg payload.
- 90 Project T missiles with a 450 km range and a 985 kg payload.
- Developing the Vector missile with an 800-1,200 km range and a 450-1,000 kg payload.
- Egypt is also reportedly seeking missile technology from China.[64]

Recent reports indicate that Egypt has been purchasing No-Dong class ballistic missiles (550 km range) from North Korea (also described as a Scud-C variant), and that there are "between 50 to 300 North Korean technicians on the ground in Egypt already working on the missile program."[65] Following the Iranian model, Egypt appears to be seeking the technological capabilities to produce its own missiles. These activities have reportedly led to tension between Washington and Cairo.[66]

Egypt's nuclear program began in 1954, and significantly progressed in 1961, following the acquisition of a 2-mw research reactor from the Soviet Union. Following the 1967 War, however, Egypt's nuclear program declined, after many of its nuclear experts emigrated abroad and economic difficulties increased.[67] Nevertheless, serious work in the nuclear sphere continued.

In the mid-1970s, as part of the realignment away from the Soviet Union and the beginning of peace negotiations with Israel, the U.S. agreed to provide Egypt with eight nuclear power plants. The U.S. proposal required accession to the NPT, and Egypt ratified the treaty in 1981. However, following the Israeli decision to forgo the American plan, the U.S. initiative lapsed.

Although the evidence indicates that Egypt dropped its nuclear weapons efforts, some Egyptians have called for a renewed effort toward this goal. Officials and journalists often argue that Israel's nuclear capability is a justification for Arab nations to build atomic bombs. According to Egypt's Foreign Minister Amre Mousa: "If there is a nuclear program in Israel, then we can blame nobody and no country if they want to acquire the same...this is an invitation to an arms race -- a very, very serious and dangerous policy."[68] Following the 1998 Indian and Pakistani tests, reports of Egyptian-Syrian and Saudi Arabian cooperation in this area also increased.[69]

In 1998, an Argentinean-built 22-megawatt research reactor at Inshas became operational.[70] Egypt also continued to seek ways to expand its nuclear development infrastructure through joint projects with Canada, and imported power reactors.[71]

In addition to its two nuclear reactors, Egypt operates a hot cell complex for plutonium extraction research, and a pilot nuclear fuel factory that is utilized to process natural uranium. Contracts have also been signed with Australia, Canada, and Niger to buy mining technology and to acquire uranium ore processing facilities.[72] Egypt also participates in a number of nuclear research projects through the IAEA, and has bilateral agreements regarding the peaceful use of atomic energy with Germany, the United States, Russia, China, Argentina, and India.[73]

Algeria

Algeria has been pursuing a WMD capability, primarily in the form of a clandestine nuclear weapons option. In 1984, Algeria purchased 150 tons of uranium concentrate from Niger, and there are numerous reports of cooperation with Iraq in this area dating from the 1980s.[74] Attention was drawn to the Algerian efforts in the early 1990s when an unreported thermal heavy water-moderated 15-mw nuclear reactor (with the potential for upgrading to 40 mw) was discovered via space imaging. The Es Salam reactor[75] was supplied by China[76] and apparently became operational in 1992 or 1993.[77] (In addition, Algeria operates a 1-mw Argentinean pool-type research reactor, which first went critical in 1989.[78]) The Es Salam nuclear reactor is estimated to have the capability to produce three to five kilograms of plutonium per year.[79] In addition, reports claim that the nuclear facility includes a Chinese-supplied hot cell that can be used to separate plutonium, albeit on a small scale,[80] and a facility for the production of radioisotopes.[81]

The construction of this reactor in an isolated part of Algeria was kept secret for a number of years, until the construction activity and tell-tale security perimeter were discovered using satellite imaging.[82] A large heavy-walled building nearby may have been intended as a full-scale plutonium plant, and a Soviet-made SA-5 surface-to-air missile battery was located at the site.[83] When it was first discovered, Algerian officials claimed that the reactor was designed for "peaceful purposes," such as electrical power generation and production of radioactive isotopes for medical research.[84] However, as analysts noted, "There are no electrical-power generation facilities at the reactor and no electric-power transmission lines are nearby....This is clearly a military nuclear reactor for weapons production."[85] China is also reported to have supplied Algeria with nuclear weapons technology, as well as expertise on matching nuclear weapons to various aerial and missile delivery systems.[86] Under pressure from the U.S., Algeria accepted IAEA safeguards in 1992, joined the NPT in 1995, and signed the CTBT on October 15, 1996.

As in the cases of Iraq, Iran, and other would-be proliferators, the capability for developing nuclear weapons continues, as does the concern regarding Algerian intentions. As Spanish government analysts have noted, "the knowledge obtained by an impressive staff of experts and scientists, as well as the availability of the installations which it will have at the end of the century, will place this country in an advantageous position to restart a military program if the corresponding political decision is taken."[87] Similarly, David Albright concluded that Algeria "might have the facilities necessary to produce military plutonium, the key element in nuclear weapons," in two years.[88] Recent reports suggest that Algeria may also be cooperating with Iraq in the development of nuclear weapons.[89]

In addition, Algeria has been a transfer point for nuclear materials, and there is evidence that uranium dioxide purchased from Argentina was delivered to Iran.[90] With regard to weapons delivery, the Algerian armed forces possess a variety of bombers, including the Su-24 Fencer, as well as short-range missiles and launchers, and (Soviet-manufactured) rockets.[91] By developing cooperative programs with other countries in the region, similar to the Iranian-Syrian model, Algeria could also acquire ballistic missiles quite quickly.

Policy Options to Control Proliferation

As is evident from this survey of proliferation activities in the region, the role of outside sources and technology transfer is vital for all of the WMD and missile programs. However, as this activity increases, the indigenous capabilities of many of these states to produce these weapons and related technologies also increases, and dependence on massive outside assistance declines. The first generation of missiles, for example, generally relies on imported weapons, perhaps assembled locally, but largely based on acquired components. However, after a few years, if left undisturbed, these weapons development groups are able to steadily increase the number and complexity of the components that they are able to produce independently, and to acquire other components from different suppliers, thereby limiting their dependence. This process is particularly applicable to the manufacture of chemical (and perhaps biological) weapons, and to a lesser degree, ballistic missiles. In contrast, the independent manufacture of fissile material for nuclear weapons remains quite difficult and developing such a capacity may take many years.

On this basis, the logical focus of non-proliferation policy based on export controls and supplier regimes should be on slowing or stopping the flow of technology for ballistic missile and nuclear programs. The Clinton administration adopted a declaratory policy reflected in the Gore-Chernomyrdin Commission, and also in public statements regarding the goals of bilateral negotiations with North Korea and with China. However, the impact of these policies was very limited. The flow of technology and expertise to Iran, Libya, and many other states in the region accelerated during this period, as did the capabilities resulting from the acquisition of these technologies and skills.

As a result, even if the rate of proliferation of WMD and missiles in the region could be slowed (requiring a rapid and major change in policy and allocation of diplomatic and economic resources by the Bush administration), much of the damage has already been done. Chemical and, perhaps to a somewhat lesser degree, biological weapons are already available to Egypt, Syria, Libya, Iraq, Iran, Algeria, and other major actors. Long-range ballistic missile development (strategic forces, in the context of the Middle East) has accelerated, as demonstrated by the recent Iranian missile tests.

At the same time, the Iranian missile program is moving relatively slowly, and if the U.S. government would pressure Iran's major suppliers to end the transfer of all missile-related technology and assistance, this would slow the completion of this program by up to a decade. However, the difficulties and resources required to force Russia, North Korea, and China to end this assistance are formidable, and such a policy would require a major effort far beyond previous attempts.

The potential for success in slowing or ending proliferation activities is potentially higher and more critical with respect to nuclear projects and technology. The obstacles to the production of fissile materials are very formidable, requiring an appropriately designed and operated nuclear reactor (for plutonium) or a sophisticated enrichment device (for uranium). None of the would-be proliferators in the region have such capabilities at this time, although Iraq had made significant progress in this direction before the 1991 war and, as noted above, the Iraqi nuclear weapons team remains intact and active. The potential for stealing or illicitly obtaining fissile material remains significant, but despite the many reports that have circulated regarding successful efforts to obtain such material, the evidence indicates that this has not occurred. (The various efforts demonstrate the vital necessity of insuring that existing nuclear materials stockpiles around the world are carefully guarded.)

Thus, the primary emphasis in U.S. and international non-proliferation and export control policy should be directed towards nuclear programs. Although the large Bushehr nuclear complex in Iran is advertised as commercial, such projects are inherently dual-use and, if completed, this program will provide the infrastructure for nuclear weapons development. Thus, a major non-proliferation program led by the U.S. government would have to press for

an end to the Bushehr project, as well as for a complete halt to the nuclear technologies related to laser and other forms of enrichment, as well as research reactors and other systems. On this basis, the Iranian effort to acquire nuclear weapons would be slowed significantly. However, in this case, as well, the required resources are formidable.

The Impact of WMD Proliferation on the Strategic Environment

In the absence of an end to the flow of these technologies, Iran, Iraq, Egypt, Syria, Libya, etc., will develop WMD capabilities and ballistic missile delivery systems in the next few years. These new capabilities will lead the dominant Middle Eastern states to attempt to deter Western intervention in the Gulf region and in other local conflict zones. This process will have a profound impact on the policy options available to the U.S., NATO, and Israel in their responses to regional security threats. Appearing before a congressional committee in March 2000, CIA Director George Tenet testified that, "The proliferation of medium-range ballistic missiles is significantly altering strategic balances in the Middle East and Asia."[92]

The proliferation of ballistic missiles *has eroded the role of air superiority* in protecting both civilian targets (cities and infrastructure facilities) and military bases. The end of the Cold War brought the end of massive Soviet arms deliveries to former allies and a reduction in their ability to maintain an effective military capability. As a result, there was a general assumption that Western air superiority in the Middle East would be assured for decades. This advantage was not only important for Israeli security, and for the U.S. in the Gulf, but also for the southern flank of NATO in Europe.

However, the widespread acquisition of ballistic missiles has eroded the importance of air superiority, and the continued pace of technological innovation is likely to increase the ability of missile forces to penetrate air defenses. First, the shift from liquid-fueled engines to solid-fuel engines reduces pre-launch preparation and warning times, allowing mobile missile launchers to quickly fire and move away from the launch site to underground shelters. Second, the longer-range missiles can be deployed from deep within national territories -- requiring attacking aircraft to use aerial refueling, which increases the complexity of such interdiction operations. In addition, as the *accuracy* of ballistic missiles improves, these weapons can be utilized against air bases and runways in a counterforce strategy to neutralize airpower.

Ballistic missiles are of decisive strategic importance when combined with WMD warheads, potentially including nuclear weapons. As the supplier limitations and sanctions imposed by the U.S. and the international community weaken, additional states are likely to pursue such weapons without worrying about the impact of international censure or stigma. Thus, in the Middle East, the emergence of a multipolar WMD environment in the next decade seems to be increasingly likely.[93]

Strategic Balance and the Return of Conventional Warfare

Such an environment will result in the erosion of the strategic superiority of Israel, the U.S., and NATO, thereby also undermining the *escalation dominance* that has reduced the degree of instability for at least the last three decades. Israeli strategic superiority, including its purported nuclear deterrent option, has provided a degree of general as well as immediate (crisis) deterrence, and also dissuaded the Arab states from employing missiles or risking the response of attacks on Israeli population centers. (The importance of escalation dominance was demonstrated during the 1973 Yom Kippur War, when the Israeli air force mounted a major attack against the Syrian Ministry of Defense in Damascus, in response to the launch of a Frog tactical missile against an Israeli base.) During the 1991 Gulf War, strategic superiority

was also important in the Iraqi decision against using chemical and biological weapons.[94] WMD proliferation undermines this superiority, thereby increasing strategic instability.

In addition, in a multipolar WMD environment in which strategic capabilities are balanced (although not necessarily symmetric), the *potential for conventional conflict* could increase. Following the series of major Arab-Israeli conventional conflicts culminating in the 1973 Yom Kippur War, the combination of the Israeli strategic monopoly and escalation dominance, on the one hand, and the conventional balance as well as the exhaustion of the major Arab states (Egypt and Syria), on the other, resulted in a decline in the potential for further full-scale conventional wars. This condition has held for the past two decades.

However, the end of the Israeli strategic deterrent monopoly, as well as the political developments in the region and the gradual return to confrontational policies in Egypt and elsewhere, have reversed this trend. With a strategic balance (if not symmetry), the emphasis on conventional warfare is likely to increase.

Strategic Depth and Territory in the Middle East

In turn, this development has served to re-emphasize the *importance of controlling territory,* as was the case in the NATO/Warsaw Pact relationship during the Cold War, and continues to be central in other theaters of warfare around the world. The 1991 Gulf War demonstrated that wars are still decided by the movement of conventional land armies, and factors such as terrain, topography, and strategic depth. These dimensions are also central in assessing likely outcomes of land warfare in the Middle East.

In future Arab-Israeli scenarios, in which ballistic missile barrages could delay Israel's reserve mobilization and rapid air response, terrain and strategic depth increase in importance. Israeli military planners must continue to develop strategies for offsetting the numerical inferiority of Israel's standing formations, by utilizing land and topography to allow its small army to hold off an assault for extended periods, while completing the Israeli reserve mobilization. In this context, territorial control and strategic depth continue to be of central importance for Israel, highlighting the centrality of the Jordan Valley and Golan Heights as buffer zones and obstacles to large-scale attacks. Despite claims to the contrary, territorial control has not lost its importance "in the missile age."

Strategic deterrence and defense are also important factors in the responses to threats posed by WMD proliferation in the region. Deterrence requires careful attention to changes in the perceived credibility, as well as the development, of survivable second-strike systems. Localized missile defense, as reflected in the deployment of the Arrow system, can enhance deterrence, particularly against first-strike counter-force scenarios, whether based on conventionally armed warheads or WMD.

Policy Options

Unless there is a radical change in the implementation of policies designed to slow or prevent proliferation, within the next decade the number of states in the Middle East with a nuclear weapons capability, as well as biological weapons and long-range delivery systems, is likely to increase dramatically. The efforts of the United States government during the past decade notwithstanding, the proliferation of weapons of mass destruction and ballistic missile technology in the Middle East has accelerated. While a major tightening of U.S. sanctions policy on technology transfer, particularly from Russia, North Korea, and China, may slow this process, the prospects for a multipolar Middle East in the next decade are quite high.

For the U.S., NATO, Israel, and other U.S.-linked allies, these developments require major adjustments in military strategy. In the U.S., the need for greater attention to these threats was emphasized by the report of the Rumsfeld Commission and in other strategic planning frameworks. In NATO, the WMD and missile threats from the Middle East are also gaining increased attention, as reflected in discussions of joint approaches and responses.[95] The deterrence and defense against WMD threats has also become the primary focus of Israeli long-term security policy.[96]

In this environment, the importance of cooperation, resource sharing, joint development, and combined operations in each of the critical areas will increase. Faced with the same threats, the U.S., NATO, and Israel will all have interests in pursuing the goals of prevention, deterrence, and defense together. Each of the three strategic "arms" of this asymmetric structure has relative advantages and unique capabilities and resources to apply to the problem. The modalities of such cooperation have begun to be explored, and will require further development and expansion in order to stay ahead of the proliferation in the region.

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