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Missile Development in the Middle East

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Summary

This monograph studies the missile development programme across the MENA region. The study highlights not only ballistic missiles but also cruise missile developments in the region. The states in MENA region are developing and acquiring surface-to-surface missiles as well as surface-to-air missiles, ship-launched and air-launched missiles despite international concerns. The study identifies the existing technology regimes to control the missile development programme and the weapons of mass destruction. It underlines the loopholes in the technology control regimes and the resultant proliferation threats in the region. The study further highlights how these developments will affect India. There are security implications for India, but there are also some positive aspects which India could exploit to enhance its opportunities in the region.

1. Introduction

Several countries in the Middle East and North Africa (MENA) have concentrated on the development of missile systems—both solid and liquid-propelled ballistic missiles—as well as cruise missiles. This has led to international concerns as many state actors have indulged in missile proliferation. Despite widespread concerns, these states are developing and acquiring surface-to-surface missiles as well as surface-to-air missiles, ship-launched and air-launched missiles.

These include countries like Iran, Turkey, Saudi Arabia, Israel, Syria and Yemen. With the improvement in technology, missile systems have become more sophisticated and accurate in characteristics and these developments have resulted in an ongoing missile and missile defence arms race in the MENA region.

The Gulf Cooperating Council (GCC) countries have acquired missile defence systems to strengthen their 'defence by denial' strategy but it appears that some of these countries are also keen to acquire offensive missile systems. Qatar is one such country that in December 2017 paraded a Chinese short-range ballistic missile (SRBM).

What makes these missile and missile defence development a concern is that countries like Iran, Iraq, Syria, and Yemen have witnessed the use of such missiles in times of wars and conflicts. The Iran-Iraq War witnessed the use of Scud missiles by Iraq which targeted the Iranian cities. In recent times, Yemen's Houthi rebels have been accused of using Iran-supplied ballistic missiles against Saudi Arabia, and UAE which support the Yemen government. Iran has also been accused of proliferating missile systems to other non-state organisations like Hezbollah and Hamas.

Besides, countries like Iran and Israel are feared to possess nuclear weapons. While Israel is on virtual state of possessing nuclear weapons, the US cancellation of the Iranian nuclear deal has reignited the possibility of Tehran developing nuclear weapons or acquiring the same from North Korea. According to reports, the Saudis have an agreement with Pakistan that they could acquire nuclear weapons from the latter within a short time as they have funded Pakistan's nuclear weapons programme. Even though Turkey has stated that it is against nuclear weapons[1] it is under the nuclear umbrella provided by the United States. However, following the attempted coup in 2016 Turkey seemed to have lost its faith in the US and there could be a possibility that Turkey could develop its nuclear weapons. The MENA region also possesses chemical weapons that can be tipped with any missile and launched against enemy targets.

While technology control regimes remain in place and despite countries being party to some of these regimes, there remains a concern regarding the adherence to these regimes and treaties. Missile defence systems are being acquired by Middle Eastern countries from more

[1] Ruslan Rehimov, "Turkey against nuclear weapons, not nuclear energy," *Anadolu Agency*, April 5, 2018, <https://www.aa.com.tr/en/todays-headlines/turkey-against-nuclear-weapon-not-nuclear-energy/1109584>

technologically advanced friendly countries, but the sophistication in ballistic and cruise missiles with counter-measures to evade missile defence systems are rendering the effort of missile defence system useless. This technological sophistication towards evading missile defence system is only making the arms race in the region more volatile.

Motivation

These developments have made the task of achieving regional stability in the Middle East more complicated, especially when some countries of the region aspire for Middle East to be a Nuclear Weapons Free Zone (NWFZ). It must be noted that the missile development programme cannot be well fathomed unless one considers the entire MENA region into account and comprehend the complexities.

Development of sophisticated missile systems can also lead to states wanting to acquire nuclear weapons for deterrence, power, and prestige. In addition, chemical and biological weapons armed on missile systems could only jeopardise regional stability and make the region more dangerous. Though many states are party to Chemical and Biological Weapons Conventions, they continue to possess these weapons or at least have the capability to produce the same.

Though there are security implications for India, there are also some positive aspects from missile development in the Middle East that it could exploit to enhance its opportunities in the region.

2. Evolution of Missile Programmes in the Middle East

The MENA region is not new to the development of ballistic and cruise missiles. The region is witnessing missile development programmes undertaken by various countries—sometimes indigenously, sometimes through proliferation or sometimes merely by acquiring the system from another country. States like Turkey are also opting for co-production and technology transfer while countries like Iran, Turkey, Saudi Arabia, Israel, Syria and Yemen are developing ballistic and cruise missiles for deterrence posture, power, prestige and to enhance their combat capabilities. Anti-ship missiles would enable states to strengthen naval capabilities and facilitate them to exert their influence and dominance in the region in a better way.

Most MENA countries have fathomed this that regional dominance or at least power play is only possible when hard power is adequate, and missiles are core components of hard power prowess. The region has time and again witnessed the use of ballistic missiles, be it the Iran-Iraq War, the Syrian crisis or the Yemeni crisis. However, missile development in the MENA region dates to the 1940s when states like Iran and Israel commenced their missile development programme.

This chapter draws out the history of missile development programmes in the MENA region and identifies the threat perception that led to this development and advancements have been made and the technologies progression. The chapter also draws out the suppliers of missile technology to Middle Eastern countries and states have been arranged in the section according to the order of importance and relevance of their missile programme and are hence, is a relative order.

Israel

In 1948 Israel established the Science Corps within the Israel Defence Forces (IDF) to develop its defence technology base. Between 194 and 1951, the Science Corps was responsible for its nascent missile manufacturing infrastructure in the Ministry of Defence.[2] This company became the national weapons development authority (Rafael) that initially specialised in rockets and experimental ballistic missile and then progressed towards full-fledged ballistic missile programme in the late 1950s and early 1960s.[3]

Noteworthy institutes like the Israeli Institute of Technology in Haifa specialising in aeronautical and missile engineering, Weizmann Institute and other research institutions laid the foundation of the missile development programme.[4] Rafael, Israeli Aircraft Industry (IAI)

[2] "Israel," *Nuclear Threat Initiative*, Updated 2012, <http://www.nti.org/learn/countries/israel/delivery-systems/> (Accessed on May 12, 2018).

[3] Ibid (Accessed on May 12, 2018).

[4] "Israel: Case Study for International Missile Trade and Non-Proliferation Project, in eds., William Potter and Harlan Jencks, *The International Missile Bazaar: The New Suppliers' Network* (Westview Press, 1993). <https://faculty.biu.ac.il/~steing/arms/missiles.htm>

and Israeli Military Industries or Ta'as as well as France's Marcel collaborated to develop the country's missile programme.[5] However, an arms embargo in 1968 ended cooperation with France. Israel then started to work on the missile system indigenously by spending over US$1billion for the Jericho missile programme.[6] These foundations led to the development of a strategic missile system called the Jericho. When in the 1970s, countries like Syria and Iran began to receive Soviet-made Scud missile systems, Israel developed its indigenous Jericho missile systems.

The Jericho-I is a 500-kilometre range two-staged solid-fuelled ballistic missile with a payload capacity of 650 kilogramme. This makes the missile system capable of carrying nuclear warheads. In the later years, with further advancement in missile technology, Jericho-I was replaced by the Jericho 2 missiles.[7] The latter have a range of 1500-3500 kilometres and are presently operational. These medium range missiles can be launched from either silo but are also capable of rail-road mobility.[8]

Jericho-3, on the other hand, has an intercontinental ballistic missile (ICBM) capability with smaller fins for greater manoeuvrability and drag stabilisation. The missile has inertial guidance while the final stage of the warhead is radar guided thereby providing it with improved accuracy.[9] The missile can carry a payload of 1,000 kilograms, but the credibility of the missile is not yet known. According to Lt. Gen Hassan Toufanian, Iranian deputy minister of war and armaments, and reportedly a CIA informant, in the late 1970s Israel developed long-range missiles capable of carrying nuclear warheads for Iran under the Project codenamed *Operation Tzor*.[10]

Israel also developed its cruise missile system called the Delilah which is an air-launched cruise missile with a range of 300 kilometres. The missile is turbojet-powered with a GPS.[11] Israel also developed the Gabriel anti-ship missiles which can be ground, air as well as sea-launched. The missile was used by it during the October 1973 War.

Israel's threat perception is mostly confined to Middle Eastern countries, including Saudi Arabia, Iran, and Syria. Even though Israel and Saudi Arabia are reportedly warming their ties

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[5] Ibid

[6] A Bowdoin Van Riper, "Ballistic Missiles and the Cold War, 1945-1990," *Rockets and Missiles: The Life Story of a Technology*, (USA: Greenwood Press, 2004), pp.91

[7] "Jericho 1," *Missile Threat,* <https://missilethreat.csis.org/missile/jericho-1/>

[8] "Jericho-2," *Missile Threat,* <https://missilethreat.csis.org/missile/jericho-2/>

[9] "Jericho," *Military Today,* <http://www.military-today.com/missiles/jericho_3.htm>

[10] Ronen Bergman, "The Twilight of the Iranian Monarchy," *The Secret War with Iran: The 30 Year Covert Struggle for Control of a Rogue State,* (Great Britain: One World Publications, 2008).

[11] "Jane's Defence Weekly: Israel Develops its First Cruise Missile," *Haaretz,* October 4, 2004, <https://www.haaretz.com/1.4708637>

now owing to the Iranian threat, the Israeli-Saudi relations have improved earlier also to serve individual strategic interests and severed ties when the interest was achieved.

Despite the Joint Comprehensive Plan of Action (JCPoA) of 2015, Iran has continued to develop ballistic as well as nuclear-capable long-range cruise missiles. Iran claims that these missiles are a part of its conventional deterrence strategy, but critics believe that Iran could equip these missiles in the future with nuclear warheads or other unconventional warheads like chemical or biological weapons. Though the new Trump Administration has withdrawn from the JCPoA the road to ballistic missiles as well cruise missiles have already been chalked out. As mentioned above, Israel also faces missile threats from Syria. In 2007, reports came in that it bombed Syria's nuclear power plant owing to its perception that Damascus would develop nuclear weapons. The range of Syrian Scud-D missiles is long enough to reach Israel.[12]

Apart from this, Israel also faces missile threats from Pakistan. There are reports that it had once planned to bomb Pakistan's nuclear facility.[13] While Pakistan has claimed that its 2,750 kilometres range Shaheen-III can reach India's Andaman and the Nicobar Islands, there are reports that this missile can reach targets in Israel. [14] The biggest concern is that the missile is nuclear capable.

Israel also faces a threat from Iran-backed non-state actor called the Hezbollah that is reported to be possessing missiles that could cause serious damage to natural gas fields in the Middle East that provide Israel with 60 percent of electricity.[15] They could target Israeli military establishments and refineries. During the Second Lebanon War of 2006, Hezbollah rockets resulted in huge economic loss for Israel coercing businesses to close while adversely affecting its tourism.[16] Hezbollah is estimated to possess sophisticated ballistic missile systems to wreath greater havoc.

Iran

Even though Iran desired to possess sophisticated military technology including missile technology, the know-how to do so was not available to it initially. Because it did not receive much support from the US in the 1960s in terms of military aid, it sought military assistance

[12] "Military Threats to Israel: Syria," *Jewish Virtual Library*, <http://www.jewishvirtuallibrary.org/syria-military-threat-to-israel>

[13] Ami Rojkes Dombe, "Pakistan- the Quiet Nuclear Threat," *Israel Defence*, December 17, 2015, <https://www.israeldefense.co.il/en/content/pakistan-%E2%80%93-quiet-nuclear-threat>

[14] Jeremy Bender, "Pakistan successfully tested a nuclear-capable missile that can hit any point in India," *Business Insider*, March 10, 2015, <https://www.businessinsider.in/Pakistan-successfully-tested-a-nuclear-capable-missile-that-can-hit-any-point-in-India/articleshow/46521394.cms>

[15] "IDF Acknowledges Serious Hezbollah Missile Threat to Israeli Natural Gas," *Algemeimer*, February 7, 2018, <https://www.algemeiner.com/2018/02/07/idf-acknowledges-serious-hezbollah-missile-threat-to-israeli-natural-gas-rigs/>

[16] "The Missile Arsenal at the Heart of Israeli-Iran rivalry," *Stratfor*, <https://worldview.stratfor.com/article/missile-arsenal-heart-israeli-iranian-rivalry>

from China. For the latter, Iran's richness in oil and natural gas was an attraction for strengthening ties with Tehran.

In the 1970s, Iran also collaborated with Israel under *Project Flower* to develop a missile system. This took place after Iran was refused the Lance missile system by the US.[17] The 1973 oil crisis gave a boost to Iranian revenues for military spending that paved the way its military modernisation programme. Iran utilised this revenue to fund the missile development project, while Israel was to provide the technological know-how.[18] This project was one of the six "oil-for-arms" contracts signed between Shah Mohammad Reza Pahlavi and Israeli Defence Minister Shimon Peres in 1977 and was kept secret from the US.[19]

In addition to the Israeli assistance in missile technology, Iran looked to China's 'Open Door Policy' in 1978 when Den Xiaoping, "liberalised China's centrally planned economy by opening production and trade opportunities to more entities, including private companies, thus undermining the elements that previously compromised a de-facto system of export controls."[20] Slowly China "gradually began to implement market reforms," and "it placed greater burdens upon state-owned defence industries to sustain themselves with less financial support from the government, inducing state-owned enterprises to look to foreign markets for sales and to reorient production toward more marketable civilian goods."[21]

This further gave an impetus to Iranian missile technology development since the Chinese were now using their missile technology for commercial purpose too to earn hard currency. The Sino-Iranian ties further buttressed when Beijing dropped its support for revolutionary communism that Iran was battling in its own territory.[22]

However, while the relation between Iran and China burgeoned, the Islamic Revolution in Iran caused a strain in the Israeli-Iranian ties. However, the Iran-Iraq War strengthened Iran-Israel

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[17] John W. Garver, "The PRC-Kingdom of Iran Relationship," *China& Iran: Ancient Partners in a Post-Imperial World,* (United States of America: University of Washington Press, 2006).pp.33.

[18] Ibid, pp.33

[19] Elaine Sciolino, "Documents Details of Israeli Missile Deal with the Shah," *The New York Times,* April 1, 1986, <http://www.nytimes.com/1986/04/01/world/documents-detail-israeli-missile-deal-with-the-shah.html>

[20] Niels Aadal Rasmussen quotes Department of Defence Report, January 2001, "Chinese Missile Technology Control- Regime and No Regime?," *Danish Institute for International Studies,* February 2007, <file:///C:/Documents%20and%20Settings/caps/My%20Documents/Downloads/nra_chinese_missile_technology_control%20(1).pdf>

[21] Ibid

[22] "Scott Harold and Alierza Nader, "China and Iran: Economic, Political, and Military Relations," *RAND Corporation,* 2012, <http://www.rand.org/content/dam/rand/pubs/occasional_papers/2012/RAND_OP351.pdf>

relationship as the former was fighting Israel's Arab rival, Iraq. However, following the Iran-Contra Affair, Iran-Israel relations were completely severed.

The hostage crisis from 1979-1981, resulted in the US cutting off defence ties with Iran that included cancelling selling combat aircraft like the F-4 and F-5 to Iran. This move from the United States affected Iran's deep strike capability and shifted its focus towards missile technology.

The Iran-Iraq War hastened the need for deep strike capability, and in 1985, the first batch of Scud missiles appeared from Libya. These missiles with ranges around 150 kilometres were militarily ineffective, but since they were used to target cities like Baghdad, they proved strategically important. However, the psychological effects of these Scud missiles on Iraq were not as much as they were on Iran when Iraq used Scud category missiles. This is because the Iranian Scud missiles could not result in the same casualty or destruction that Iraqi missiles created in Tehran and other towns which forced the population to flee the cities. [23]

Before long, Iran also sought missile technology assistance from North Korea while agreeing to fund the latter's missile programme. Iran used the Scud category missile systems from North Korea during the Iran-Iraq War. The missiles proved their combat capability while limitations of the missile systems were also identified and the required modifications were noted. This proved conducive for North Korea as otherwise, it would have had to undergo the cumbersome and expensive process of continually testing its missile systems to fathom their technological limitations and improvisation. Scud-Cs from North Korea became the Iranian Shahab-2 ballistic missile. The IISS suggests that Iran has been able to allot a greater range to Shahab-2 missiles by reducing the warhead weight than that of the Shahab-1 and by providing the missile with additional propellant.[24]

By the late 1980s, the Soviet Union had forced Libya to stop providing Scuds to Iran. This was the time when Iran realised the need for an indigenised missile technology programme. In 1988, Tehran developed the Mushak missile system that made it self-reliant in missile development programme.[25] It was a solid fuel propelled system developed during the Iran-Iraq War using nitrocellulose fuel. However, after the disintegration of the Soviet Union, when relations

[23] Gregory S. Jones, "The Iraqi Ballistic Missile Programme: The Gulf War And the Future of the Missile Threat," *American Institute for Strategic Corporation,* Summer 1992, <http://www.dtic.mil/dtic/tr/fulltext/u2/a344618.pdf>

[24] Iran's Ballistic Missile Programme," *Iran's Strategic Weapons Programme, IISS* (New York: Routledge, 2005).

[25] "Iran Missile Milestone: 1985-2014," *Iran Watch,* April 17, 2014, <http://www.iranwatch.org/our-publications/weapon-programme-background-report/iran-missile-milestones-1985-2014>

between Iran and Russia improved, it is believed that Iran received assistance from Russia too for the development of its missile system.[26]

Assistance for Iran's solid propelled missile technology came from China, which assisted in the Oghab programme initiated in 1982. This resulted in the development of the Fajr solid propelled rocket system, and Iran has used this technology to develop longer-range missile systems.

In May 2001, for the first time Iran tested Fateh-110. The advanced version Fateh-110A was test fired in September 2002. China's assistance could have enabled Iran to move beyond double based propellant systems which it used in the past for its solid propelled rockets. Double based propellant systems were technically hazardous since they required that the manufacturing propellant grains with a diameter larger than 600mm or 700mm could not be a choice for the extrusion process. This restriction in the diameter could have limited the range-versus payload capabilities of the rockets which were using the double-base propellants.[27] Thus, to be able to launch rockets to longer ranges, composite propellants were required for which China could have assisted.[28] In 2008, Iran tested a 2000-kilometer range solid propelled ballistic missile called the Sejjil.

For Iran, ballistic missiles have always been a currency of power and prestige as it wants to check the growth of its Sunni adversaries. According to Marsh E. Burfeindt, Iran "sees itself equally powerful as Saudi Arabia and the legitimate voice of Islam."[29] Iran is apprehensive of Turkey and Israel and given the distance from Tehran to Tel Aviv which is 1,598 kilometres, Iran needed a long-range missile capability beyond the Scud system that could provide a deterrent against Israel.

In 2009, when Iran conducted its missile war games just two days after the United Nations watchdog, International Atomic Energy Association (IAEA) revealed the existence of a second nuclear plant, the Iranian air force commander (IRGC) stated that for those states which "harbour[ed] dreams about undertaking military invasion" against Iran, this was a message "firmness, destructiveness, real and endless resistance."[30] There is little doubt that Iran must have been apprehensive of an Israeli attack on its nuclear facility as Israel had previously

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[26] Michael Eisenstadt, "Russian Arms and Technology Transfers to Iran: Policy Challenges for the United States," *Arms Control Association,* March 2001, <https://www.armscontrol.org/act/2001_03/eisenstadt>

[27] N.2

[28] "Shahid Bagheri Industrial Group," *Iran Watch,* <https://www.iranwatch.org/iranian-entities/shahid-bagheri-industrial-group-sbig>

[29] Marsh E. Burfeindt, "Rapprochement with Iran," in ed., Thomas A. Johnson, *Power, National Security, and Transformational Global Events* (United States of America: CRC Press, 2012)

[30] "Iran Test Fires Tondar missiles, Shahab to come," *News.com.au,* September 28, 2009, <http://www.news.com.au/iran-test-fires-tondar-missiles-shahab-to-come/story-e6frfkp0-1225780275208>

bombed Iraqi and Syrian nuclear facilities. A deep-strike capability that could destroy Israeli cities proved a perfect deterrent against a possible Israeli attack on Iranian nuclear facilities. Ballistic missiles for Iran are a crucial component of its conventional deterrence and for its defence.

Despite international pressures like the UN Security Council Resolutions to refrain from developing ballistic missiles, Tehran continued with its missile development programme. Not only did it venture into ballistic missiles, but also developed sophisticated long-range nuclear-capable cruise missiles. The Soumar cruise missile has a range of 2,500 kilometres with pinpoint accuracy and was test fired in 2015. The missile bears a resemblance to Russia's Kh-55 cruise missile and is assumed to be nuclear capable.[31] It must be noted that Soumar is not the first cruise missile that Iran possesses as it also possesses anti-ship cruise missiles like the Chinese C-802 (Noor), C-801 (Kowsar), and the C-704 under the name Nasr-1. These missiles provide Iran with greater leverage in the Persian Gulf.

In October 2015, Iran also test-fired the Emad ballistic missile with a range 1,700 kilometres with advanced guidance and control systems in its nose cone providing it better accuracy. [32] The following year, Iran displayed its SRBM called Zulfiqar which means 'Lord of Spines' in Arabic with a range of 700-750 kilometres. [33]

It has also tested a 2,000-kilometers range Khurramshahr missile system that can carry multiple warheads. According to reports, the missile was smaller in shape as compared to the Shahab category missile systems and are more tactical in nature.[34] In 2018, Iranians test fired the long-range ship launched Qadir cruise missile and this would strengthen its maritime deterrence capability. Now the missile can reach targets up to a range of 3,000 kilometres.

In 2014, the Iranian Defence Minister, Brigadier General Hossein Dehqan observed that the Qadir would be upgraded soon with range doubled and would be named as Moqtader missiles.[35] At the moment, the missiles are targeted at Iran's Middle East rivals, but in 2017, the deputy head of IRGC, Brigadier General Hossein Salama made it clear that so "far we have felt that

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[31] Debalina Ghoshal, "Political and Strategic Signal behind Iran's new Soumar cruise missile," *Revue Defence Nationale,* April 2015.

[32] Sam Wilkin, "Iran tests new precision-guided ballistic missile," *Reuters,* October 11, 2015, <https://www.reuters.com/article/us-iran-military-missiles/iran-tests-new-precision-guided-ballistic-missile-idUSKCN0S505L20151011>

[33] Behnam Ben Taleblu, "Assessing the Latest Iranian Ballistic Missile: The Zulfiqar," *Military Edge,* September 29, 2016, <https://militaryedge.org/analysis-articles/assessing-latest-iranian-ballistic-missile-zulfiqar/>

[34] "Khorramshahr," *Global Security,* <https://www.globalsecurity.org/wmd/world/iran/khorramshahr.htm>

[35] "Iran to double range of Qadir cruise missile, Readying to test-fire long-range Sayyad missiles," *Fars News,* August 25, 2014,< http://en.farsnews.com/newstext.aspx?nn=13930603000388>

Europe is not a threat….but if Europe wants to turn into a threat, we will increase the range of our missiles." [36]

Turkey

Turkey has been under the extended nuclear deterrence or commonly called the nuclear umbrella of the US since the Cold War days, and hosts tactical nuclear weapons (TNWs), B61 bombs that could be air dropped.[37] This means that the US TNWs have been deployed in Turkey since the Cold War days.

Though air power is a way to project Turkish offensive and defensive strength, the susceptibility of aircraft to enemy air defence systems has been a concern. Turkey has long desired to become a regional power with the ability to exert more significant influence and it also wants to become a member of the European Union. However, Turkey is not without adversaries who are actively developing ballistic and cruise missiles and Iran, Saudi Arabia, Israel possessing sophisticated missile systems are a concern for Turkey.

Turkey hence wishes to have a spectrum of missile systems ranging from 300 kilometres to 2,500 kilometres.[38] Initially it received missile systems from China, but its long-range missile technology programme is reportedly indigenous. The J600-T Yildrim which has a range of 250 kilometres is a Chinese technology. The long-range missile system that Turkey announced it would develop in 2011 would be assisted by its scientific research institute in Tubitak.

Turkey in 2017, test fired the Bora missiles, with a range of 280 kilometres. Though it has a tactical range Turkey's Defence Minister Fikri Isik was confident that Turkey could improve its technology.[39] Though it is not known to pursue its nuclear weapons programme, Turkey is actively pursuing a nuclear energy programme and there are concerns that Ankara could develop nuclear weapons in future.[40]

This is even more possible as there are cracks between Turkey and the US relationship especially after the failed coup. There are concerns that Iran could develop nuclear weapons

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[36] "Iran warns it would increase missile range if threatened by Europe," *Pakistan Today*, November 26, 2017, <https://www.pakistantoday.com.pk/2017/11/26/iran-warns-it-would-increase-missile-range-if-threatened-by-europe/>

[37] Kingston Reif, "U.S. Nuclear Weapons in Turkey Raises Alarm," *Arms Control Association*, November 2017, <https://www.armscontrol.org/act/2017-11/news/us-nuclear-weapons-turkey-raise-alarm>

[38] "Turkey: Medium Range Ballistic Missiles," *Global Security*, <https://www.globalsecurity.org/wmd/world/turkey/mrbm.htm>

[39] Suraj Sharma, "Turkey Test Fires first domestically made ballistic missile," *Middle East Eye*, May 11, 2017, <http://www.middleeasteye.net/news/turkey-test-fires-first-domestically-made-ballistic-missile-1395267736>

[40] Mustafa Kibaroglu, "Turkey's Nuclear Contradictions," *Bulletin of Atomic Scientists*, September 17, 2015, <https://thebulletin.org/roundtable_entry/turkeys-nuclear-contradictions/>

and other countries may also follow suit. Even though under its 'zero-problems with its neighbours' policy,[41] Turkey has improved its relations with Iran, it would not be comfortable with a nuclear-armed Iran.

Not only has Turkey concentrated on long-range ballistic missiles, but it is also developing stand-off-missiles (cruise missiles) that would increase the range of the aircraft from where they are fired. This was called the 'Sensitive Guided Stand-off Cruise Missiles,' and the logic behind this was to enable the Turkish Air Force to hit behind enemy lines without entering the range of enemy defence systems with great accuracy.[42] When it was initially developed and introduced in 2011, the missile had a range of 180 kilometres that could be launched from the F-16s. However, over time, Turkey started to work on longer-range versions system with a range of 300 kilometres to 500 kilometres and there were reports that its range could be boosted up to 2,500 kilometres. In 2014, there were reports that the SOM cruise missile would be modified for the F-35 Joint Strike Fighters (JSF).[43]

Saudi Arabia

In the 1980s, Saudi Arabia purchased the DF-3 liquid-fuelled ballistic missiles from China along with ten launchers. The missiles were modified by China and supplied to Saudi Arabia for carrying conventional warheads. [44] In 2007, China sold the DF-21 ballistic missile to the Kingdom with a range of 1,700 kilometres though the versions given to Riyadh were reportedly modified to carry only conventional warheads. The Saudi interest in acquiring ballistic missiles emanates from the growing ballistic missile capability of Iran and the Iranian nuclear impasse and the Israeli nuclear threat. The DF-21 had a greater range than the DF-3s and were solid propelled making them both road/rail mobile.

The Saudis have considered themselves to be the leader of the Muslim world and the protection of Mecca and Medina remain crucial to them. In fact, when ballistic missiles were acquired in the 1990s, Prince Salman of Saudi Arabia justified on the grounds that, "the interrelated objectives of the defence and security of (Saudi Arabia's) holy places and of the just causes of the Arab and the Islamic Ummah, which constitutes complimentary facets…"[45]

Nevertheless, such missile transfer had violated the Missile Technology Control Regime (MTCR) norms that restrict state signatories from transferring missiles of ranges above 300

[41] Ahmet Davutoglu, "Turkey's Zero-Problems Foreign Policy," *Foreign Policy,* May 20, 2010, <https://foreignpolicy.com/2010/05/20/turkeys-zero-problems-foreign-policy/>

[42] "Sensitive Guided Stand-off Cruise Missile," *Global Security,* <https://www.globalsecurity.org/wmd/world/turkey/lrcm.htm>

[43] "Tamir Eshel, "Turkey, US to modify the SOM cruise missile for use with F-35," *Defence Update,* October 24, 2014, <https://defense-update.com/20141024_som-j.html>

[44] "Saudi Arabia's New Missile Force," *The Institute for National Security Studies,* February 24, 2014, <http://www.inss.org.il/publication/saudi-arabias-new-missile-force/>

[45] Norman Cigar, "Saudi Arabia's Strategic Rocket Force: The Resilient Service," *Middle East Studies Monograph Series,* No.6, September 2014, <https://fas.org/nuke/guide/saudi/srf.pdf>

kilometres and payload above 300 kilograms. Reports also suggest that the DF-21 missile transfer has taken place with the knowledge of the US on grounds that the missiles would not be capable of carrying nuclear warheads.[46]

Riyadh has taken an interest in cruise missiles and has acquired Storm Shadow cruise missiles from Britain with a range of 500 kilometres and the US also plans to transfer SLAM-ER cruise missiles. The sale for the missiles for the Saudi Air Force has been approved by the US in 2013 and in 2018, production of the missiles for Saudi Arabian Air force restarted.[47]

There have also been reports that Saudi Arabia had funded the Ukrainian missile programme called the Grom-2, a short-range surface-to-surface ballistic missile. US$40million has been invested by Saudi Arabia and is also believed to be one of the clients for the missile system. The missile is in direct competition to Russian Iskander missiles.[48] In the recent past, despite the US being the largest arms supplier, Saudi Arabia has sought interest in Iskander because some of the most sophisticated US weapon systems may be stalled owing to a veto by the Israeli lobby in the Congress. Russia, on the other hand, realises Saudi Arabia is the leader in the Arab world but the deal has not yet materialised.

Syria

Prior to the civil war Syria is reported to have possessed one of the largest ballistic missile arsenals that included the Soviet-made Scud-B, Scud-C, and Scud-D. The threat from Turkey, Israel, and Saudi Arabia led Syria to acquire and develop ballistic missile systems. Later with assistance from Russia and North Korea, Syria managed to commence its domestic production of Scud category missile systems.[49] There are also reports that Syria has chemical weapons stockpile that could be delivered by Scud missiles. [50] The Scud-B category missile systems were acquired from Russia.[51] Syria has long received missile technology assistance from North

[46] Cited Jeffrey Lewis in Jeff Stein, "Exclusive: CIA Helped Saudis In Secret Chinese Missile Deal," *Newsweek,* January 29, 2014, <https://www.newsweek.com/exclusive-cia-helped-saudis-secret-chinese-missile-deal-227283>

[47] Jeremy Binnie, "SLAM-ER production to be restarted for Saudi Air Force," *Janes Defence Weekly,* April 11, 2018, <http://www.janes.com/article/79184/slam-er-production-to-be-restarted-for-saudi-air-force>

[48] "Ukraine unveils new Grom-2 short-range ballistic missile," *Army Recognition,* January 3, 2018, <http://www.armyrecognition.com/january_2018_global_defense_security_army_news_industry/ukraine_unveils_new_grom-2_short-range_ballistic_missile.html>

[49] "Syria," *Nuclear Threat Initiative,* Updated 2018, <http://www.nti.org/learn/countries/syria/>

[50] "Missile Programmes", *Global Security,* <https://www.globalsecurity.org/wmd/world/syria/missile.htm>

[51] Ibid

Korea and in 1992, Syria flight tested the Scud-C missile systems that it reportedly acquired from North Korea in 1991. [52]

According to a UN investigation report, during 2012-17 North Korea transferred prohibited ballistic missiles along with other conventional arms to Syria. There are reports that North Korea's Ryonhap-2 Corporation had assisted the Syrian ballistic missile programme that was involved in the development of manoeuvrable re-entry vehicle (MaRV) Scud-D (MD).[53] The range of the Scud-Ds was increased with assistance from North Korea.

In August 2017, Russia was reported to have supplied a shipment of fifty SS-21 missiles and four longer-range SS-26 Iskander missiles to Syria.[54] The one going civil war witnessed missile attacks. Russia, China, and Iran have supported the Assad regime while the West is supporting the rebels fighting the Assad regime.

One of the greatest concerns is that missiles can reach non-state actors through Syria. In past Hezbollah and Hamas have received missile systems via Syria coming from North Korea and Iran. In 2017, there were reports that Iran was building a missile factory in Syria for the production and storage of long-range missile systems that can reach Israel.[55] In May 2018 Israel reportedly fired missiles on a weapon depot in Syria's Dabaa military air base that belonged to the Hezbollah. [56]

Yemen

Yemen has had Scud category ballistic missile systems and there are reports that it possesses the North Korean Hwasong-5 and 6 missiles in its arsenal. According to reports, Yemeni security forces had acquired the Scud missiles in the 1990s and 2000s from North Korea. [57] Missiles were also supplied by the Soviets during the North-South divide in the country.[58] The

[52] "Ballistic Missiles: Who are the Future Suppliers?," *Iran Watch*, March 2, 1999, <https://www.iranwatch.org/our-publications/speech/ballistic-missiles-who-are-future-suppliers>

[53] "North Korea arming Syria with Chemical Weapons, Ballistic Missiles, Secret UN Report Claims," *Ha'aretz*, February 28, 2018, <https://www.haaretz.com/middle-east-news/syria/secret-un-report-north-korea-arming-syria-with-chemical-weapons-1.5863797>

[54] Lucas Tomlinson, "Russia sends Syria its largest missile delivery to date, US officials say," *Fox News*, February 8, 2017, <http://www.foxnews.com/world/2017/02/08/russia-sends-syria-its-largest-missile-delivery-to-date-us-officials-say.html>

[55] "Iran building missile factory in Syria," *Times of Israel*, August 15, 2017.

[56] "Missiles hit Hezbollah weapon depot in Syria's Homs: monitor," *Arab News*, May 24, 2018, <http://www.arabnews.com/node/1309206/middle-east>.

[57] Jacob Lokshin, "Yemen," *Missile Defence Advocacy*, July 2016, <http://missiledefenseadvocacy.org/missile-threat-and-proliferation/missile-proliferation/yemen/>

[58] Ben Watson, "The War In Yemen and the Making of a Chaotic State," *The Atlantic*, February 2018, <https://www.theatlantic.com/international/archive/2018/02/the-war-in-yemen-and-the-making-of-a-chaos-state/551987/>

Hwasong 5 missile was a version of Soviet Scud missiles that were once transferred to Egypt during the October 1973 War against Israel. Later, Egypt sided with the US and this made the replacement of Scud missiles with more advanced one an impossible task. Egypt decided to deliver these Scuds to North Korea.

South Yemen that conflicted with North Yemen during the civil war had received Soviet Scud missiles in 1994. North Yemen and South Yemen also received the Soviet Tochka. However, after the unification in 1990, Yemen sided with the US that resulted in the Soviet Union prohibiting from supplying missiles to Yemen. This was the time when Yemen turned to North Korea for missile supplies. Due to Yemen's cooperation in combating terrorism, the US did not even impose any sanction on Yemen for its missile proliferation activities with North Korea.[59]

During the Yemen crisis since 2011, the Houthis got hold of these missile systems and have used them against Saudi Arabia as the latter has been supporting the Yemeni government against Houthi rebels. Yemen also converted the Soviet-made surface-to-air missiles into surface-to-surface ballistic missiles called Qaher-1 and M2[60] and they have a range of 250 kilometres and 400 kilometres respectively. In 2016, Houthis unveiled advanced Scud version missile systems called the Burkan-1, and they have been used against Saudi Arabia. Burkan-2 missiles have longer range and was reportedly fired against Riyadh in April 2018 and was believed to have travelled more than 800 kilometres. [61]

Iran has also reportedly supplied short-range missiles to the Houthi rebels in defiance of the UN Resolution 2231[62] which the rebels have used against Saudi Arabia. Missiles recovered from Riyadh airport that were fired by Houthi rebels were reported to be Qiam missiles, a variant of Scud that belonged to Iran.[63] There are reports that Houthis have Iranian Zelzal-3

[59] "Yemen," *NTI*, Last Updated July 2016, <https://www.nti.org/learn/countries/yemen/>

[60] Sebastien Roblin, "How North Korean Weapons Could Start a War?", *National Interest*, November 18, 2017, <http://nationalinterest.org/blog/the-buzz/how-north-korean-weapons-could-start-war-the-middle-east-23251?page=2>

[61] "Yemen's Houthi rebels fire ballistic missile at Saudi capital," *Al Jazeera*, April 12, 2018, <https://www.aljazeera.com/news/2018/04/yemen-houthi-rebels-fire-ballistic-missile-saudi-capital-180411153418562.html>.

[62] Emma Scott, "Implementation of the UN Security Council Resolution 2231 (2015) Three Years On: The UN Secretary General's Sixth Report," *Project Alpha*, December 17, 2018," <https://projectalpha.eu/implementation-of-un-security-council-resolution-2231-2015-three-years-on-the-un-secretary-generals-sixth-report/#>

[63] "US gives evidence Iran supplied missiles that Yemen rebels fired at Saudi Arabia," *The Guardian*, December 14, 2017, <https://www.theguardian.com/world/2017/dec/14/us-gives-evidence-iran-supplied-missiles-that-yemen-rebels-fired-at-saudi-arabia>

missiles and they could reach Mecca though reports of it supplying missiles to Houthi rebels have been denied by Iran.[64]

In 2017, Yemen unveiled an anti-ship cruise missile called the Al-Mandab 1 that looked like the Chinese C-801 anti-ship missile that Yemen acquired in the mid-1990s.[65]

Qatar

In December 2017, Qatar unveiled the Joint Attack Rocket and Missile System (JARMs) developed by China National Precision Machinery Import and Export Corporation (CPMIEC.[66] The missile is called the SY400 BP-12A system that can reach targets with a range of 400 kilometres and can threaten the Gulf region.[67] The missile is an export alternative to the Russian Iskander missile system. These developments have taken place during the Qatar crisis[68] within the GCC and have brought Qatar closer to China and Russia.

UAE

In 1998, UAE procured Black Shaheen cruise missile from France and the United Kingdom despite the missile exceeding MTCR limitations.[69] A few years earlier, in 1989 it had also acquired Scud B category missile systems from North Korea.[70]

Iraq

Under Saddam Hussein Iraq constantly sought to develop long-range ballistic missiles to deliver both conventional as well as WMD warheads. By the mid-1980s, it had Scud category missiles acquired from the Soviet Union and they were modified to improve the range and were used in the Iraq-Iran war.[71] The missiles were reported to have been purchased along with

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[64] Debalina Ghoshal, "Houthi Missile Attacks and the Many Influences of Yemen's Conflict," *The Jamestown Foundation,* March 9, 2018, <https://jamestown.org/programme/houthi-missile-attacks-many-influences-yemens-conflict/>

[65] Jeremy Binnie, "Yemeni rebels unveil anti-ship missiles," *Jane's 360,* November 9, 2017, <http://www.janes.com/article/75566/yemeni-rebels-unveil-anti-ship-missiles>.

[66] Jeremy Binnie, "Qatar parades Chinese ballistic missiles," *IHS Janes Defence Weekly,* December 20, 2017, <http://www.janes.com/article/76529/qatar-parades-chinese-ballistic-missiles>

[67] Awad Mustafa, "Why is Qatar showing off its new short-range Chinese ballistic missiles?", *Al Arabiya English,* December 20, 2017, <https://english.alarabiya.net/en/News/gulf/2017/12/20/Qatar-showcases-offensive-ballistic-missiles-targeting-neighbors.html>

[68] Shaul Shay, Qatar's Rearmament Efforts As Leverage against the Boycott," *Israel Defense,* December 26, 2017, <https://www.israeldefense.co.il/en/node/32358>

[69] "United Arab Emirates," *NTI,* Last Updated October 2018, <https://www.nti.org/learn/countries/united-arab-emirates/>

[70] Ibid

[71] "Iraq," *NTI,* June 2012, <http://www.nti.org/learn/countries/iraq/delivery-systems/>

eleven transporter erector launchers (TELs).[72] By 1988, Iraq had successfully test fired the Al-Hussein's modified version Al-Abbas with a range of 950 kilometres. The missile achieved a greater range than Al-Hussein with the help of higher energy cryogenic fuel but surprisingly, these missiles were never deployed by Iraq.

During the Iran-Iraq War, Scud-B missiles were used along with the Al-Husseins and Al-Hijarah. The Al-Husseins could carry biological and chemical warheads with a more extended range that was achieved by cutting the fuel and oxidiser tanks and by reducing the payload mass. The decision to increase the range of the missiles was taken due to the realisation that the missiles were not capable of reaching Tehran while Iran's missiles could reach Baghdad given the city's proximity to the Iran-Iraq border. With the success of Iraq's Scuds creating terror in the minds of the Iranian population and its success in the war, further improvisations were made. It was difficult to suppress the Iraqi missiles, and Baghdad managed to use these missiles in a way that was able to contain the Iranians politically thereby leveraging military advantage.[73] It must be, however, noted that these missiles were only used in the second and third phases of the war and in the first, Iraq used only Frog missiles that were acquired from the Soviet Union.

The Gulf War over Kuwait experienced the use of missiles in large numbers than before. However, with the defeat of Iraq, resulted in the UNSC imposing a halt to its ballistic missile programme.[74] Though the missiles were destroyed, Iraq was not prohibited from maintaining the scientists and infrastructure involved in the ballistic missile programme. Iraq was then seeking long-range capabilities that could deliver WMD. In the past, Iraq also financed the Iraq-Egypt-Argentina missile project and the project was stalled due to internal conflicts between the three countries. Iraq's solid fuelled Ababil100 missile and the liquid fuelled Al-Samound projects that were pursued would have allowed it to follow production line to develop longer-range versions of such missile systems. Unconfirmed reports also suggest that North Korea had provided No Dong ballistic missile systems to Iraq. [75]

Libya

In 2011 during the Arab uprising, there were reports that Libya had used Soviet-era Scud ballistic missiles against the rebels. This was possible as until the 2003 renunciation of the WMD programme by Colonel Muhammar Qadhafi, Libya sought to develop and improvise its missile capabilities. One of the reasons was Qaddafi's desire and ambition to become prominent in the Arab world. Libya was rich in oil resources and the cash earned from oil revenues was diverted towards its missile development programme. In the 1990s, Qaddafi justified the missile development programme because, "if they [the United States] know that

[72] "Iraq's Missile Programme Profile," *Wisconsin Project,* January 1, 1999, <https://www.wisconsinproject.org/iraqs-missile-programme-profile/>

[73] N.23

[74] N. 73

[75] "North Korea's Missile Trade," *Frontline,* <https://www.pbs.org/wgbh/pages/frontline/shows/kim/nukes/noflashmap.html>

you have a deterrent force capable of hitting the United States, they would not be able to hit you. If we had possessed a deterrent- missiles that could reach New York- we would have hit it at the same moment. Consequently, we should build this force so that they and others will no longer think about an attack."[76] He even threatened to prepare to attack Naples in Italy which has NATO military base.[77]

Libya managed to indigenously develop ballistic missiles based on the Scud-B and Frog missiles acquired from the Soviet Union. It attempted to purchase medium and intermediate-range ballistic missiles, but these efforts were thwarted due to international pressures and the UN sanctions imposed on Libya between 1992 and 1997.[78]

Libya was able to develop a missile system of range 300-700 kilometres. This was possible as in the 1980s, Libya collaborated with a German firm called Orbital Transport und Raketan AG (OTRAG) to set up a missile infrastructure, which came to a halt after the then West German government barred the company from carrying out any activities in Libya. [79] Libya managed to develop Al-Fatah missiles with a range 950 kilometres, but the missile failed to progress from preliminary stage due to lack of technological assistance from foreign countries owing to the US sanctions.[80]

But despite these sanctions, Libya reportedly managed to acquire components and technology from former Yugoslavia, China and India[81] and in the 1990s it allegedly cooperated with Iran for its missile technology programme.[82] However, Libya failed to acquire the M-11, M-9 and the DF-3 missile systems from China due to pressure from the US. It received assistance from Serbia and Russia and there are reports that No Dong components from North Korea had reached Libya though there was no evidence of the missile being in Libya. In the 1990s, Libya also entered into missile cooperation agreement with Iran and paid Iran US$31 million to

[76] "Libyan Missiles," *Global Security*, <https://www.globalsecurity.org/wmd/world/libya/missile.htm>

[77] Ibid

[78] John Hart and Shannon N. Kile, "Libya's renunciation of nuclear, biological and chemical weapons and ballistic missiles," *Stockholm International Peace Research Institute*, 2005, <https://www.sipri.org/yearbook/2005/14>

[79] "Libya," *NTI*, January 2015, <https://www.nti.org/learn/countries/libya/delivery-systems/>

[80] N.78

[81] N.80

[82] N.81

Tehran for material and expertise to expand the range of Scud B missiles. [83]Even though Libya made efforts to improvise its missile capabilities, most of them proved a failure.[84]

In 2003, however, Libya agreed to eliminate its WMD programme following the US-led invasion of Iraq.[85] Libyan officials provided information and documentation of the nuclear, chemical, biological weapons as well as ballistic missile programmes. It was clear that Libya wanted to avoid the fate of Iraq and at the same time wished to end the prolonged sanctions that were imposed on Libya for pursuing WMD capability.[86]

Egypt

Egypt's missile development programme commenced as early as in the 1960s and by it already successfully test fired four surface-to-surface missiles. According to some reports, Egypt received technical assistance from former Nazis.[87] After the Suez War of 1956 Egypt's financial situation was in doldrums, and finance had to be diverted towards war damage and reconstituting the armed forces. The cheaper option for military modernisation was to acquire long-range rocket systems. By 1966, however, the then East Germany reportedly severed missile cooperation with Egypt. [88]

In the 1970s until its relationship soured, Egypt acquired the Frog missiles and the Scud-B category missile systems from the Soviet Union. These missiles strengthened Egypt's deterrence vis-à-vis countries like Israel and Libya that were already developing missile capabilities.[89] Some of these missiles acquired from the Soviet Union were also used by Egypt during the 1973 War. Egyptian leader Gamal Abdel Nasser turned to the Arab world for help and for a while Egypt even partnered with Syria to form the United Arab Republic (UAR) that pursued a joint military industrialisation programme.

Egypt wished to set up its missile production base that would have enabled it to produce missiles for exports in return for hard cash that Egypt was in dire need of. Egypt initiated peace

[83] N. 81

[84] "Libya: Delivery Systems," *NTI,* Updated January 2015, <http://www.nti.org/learn/countries/libya/delivery-systems/>

[85] David E. Sanger and Judith Miller, "Libya to give up arms programs, Bush announces," *The New York Times,* December 20, 2003, <https://www.nytimes.com/2003/12/20/world/libya-to-give-up-arms-programs-bush-announces.html>

[86] "Libya: Nuclear," *NTI,* Updated January 2015, <http://www.nti.org/learn/countries/libya/nuclear/>

[87] Ronen Bergman, "The Secret History of Israel's War Against Hitler's Scientists," *Newsweek,* April 12, 2018, <https://www.newsweek.com/2018/04/20/israel-secret-war-mossad-hitler-scientists-world-war-ii-egypt-nasser-883630.html>

[88] "Egypt," *Federation of American Scientists,* <https://fas.org/nuke/guide/egypt/missile/index.html>

[89] "Egypt: Aspiration for Missile Production," *Directorate of Intelligence,* 1988, <https://www.cia.gov/library/readingroom/docs/CIA-RDP89S01450R000200210001-2.pdf>

with Israel after the 1973 War, and it had the time and resources that could be directed towards its missile development programme. [90] This was also the time when Egypt's relations with Moscow had soured and hence, the Soviet Union did not play any further role in the missile development programme.[91]

By 1982, Egypt signed an agreement with Iraq and Argentina to become a part of the Condor project that would enable them to develop missiles up to the range 1,000 kilometres, and by 1987-1990, many Egyptian technicians were working in Iraq on this project. During this period, Egypt had also acquired technical documents and drawings of the North Korean Scud-B programme.[92] However, it must be noted that from 1976-1981, it was North Korea that had received the Scud-B missiles via Egypt and this cooperation led to the development of North Korean No-Dong as well as the Taepo Dong missile systems. [93] Later, Egypt was assisted by North Korea in its Scud-C programme also called the Project-T that aimed to increase the range of the Scud-C by reducing the payloads.

There were reports that in 2001, Egypt had acquired No-Dong ballistic missiles from North Korea that could reach any part of Israel from deep within Egypt's territory. Cairo however, denied that it had purchased such missile systems from North Korea. [94] According to reports, Congressional leaders had threatened President Hosni Mubarak of cutting aid worth US$1.3billion if Egypt bought the No Dong missiles from North Korea.[95] Egyptian Foreign Minister Ahmad Maher reiterated his country's stand during his visit to the US, "My President said there is no missile deal, and my president does not lie."[96]

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[90] Ibid

[91] Owen L. Sirs, "Proliferation Lessons,' *Nasser and the Missile Age in the Middle East,* (USA: Routledge, 2006), pp.197

[92] "Egypt Nuclear, Chemical, and Missile Milestones- 1960-2000," *Wisconsin Project on Nuclear Arms Control,* September 1, 2000, <https://www.wisconsinproject.org/egypt-nuclear-chemical-and-missile-milestones-1960-2000/>

[93] Robert Windrem, "Concerns grow over Egypt's WMD Research," *NBC News,* February 7, 2011, <http://www.nbcnews.com/id/41452744/ns/world_news-mideast_n_africa/t/concerns-grow-over-egypts-wmd-research/#.Wzxg5dIzbIU>

[94] "Egypt to pose a future threat," *The Washington Times,* July 23, 2002, <https://www.washingtontimes.com/news/2002/jul/23/20020723-034656-1751r/>

[95] "Report: US Trying to Stop Egypt from Buying No Dong Missile Engines," *Albawaba News,* June 18, 2001, <https://www.albawaba.com/news/report-us-trying-stop-egypt-buying-no-dong-missile-engines>

[96] Nathan Guttman, "Egypt gives U.S. satisfactory replies' on missile deal with North Korea," *Haaretz,* July 15, 2001, <https://www.haaretz.com/1.5358500>

However, in 2013, there were reports that a shipment of spare parts of Scud-B missiles was intercepted at the transit when being shipped by air from North Korean embassy in Beijing to Cairo labelled as parts fish processing machinery. [97]

Chinese and North Korean missile experts were spotted in 2013 in Egypt to sell upgrades of missile design and production capabilities.[98] There could be a possibility that these countries were training launch crews to prepare them for combat conditions.

Egypt also received assistance from the China Precision Machinery Import-Export Corporation (CPMIEC), a company sanctioned by the US for its short-range missile programme. This was perhaps due to US delaying the sale of F-16s to Egypt.[99] Egypt also possesses Chinese anti-ship cruise missiles, HY-2 missiles with a range of 200 kilometres, US Harpoon Block 2 anti-ship missiles, Italian Otomat and Chinese Scrub-brush cruise missiles. [100]

After the Trump administration came into office in 2017, the US decided to cut aid worth US$290 million and one of the reasons was Egypt's close ties with North Korea which included missile cooperation.[101]

Algeria

Algeria is known to have possessed the Scud-B ballistic missiles and Frog-7 missiles supplied by the Soviet Union in the 1980s when the latter was looking to expand its influence in the Middle East and curb Western influence. Providing weapon systems was an easy way to develop relations with countries. [102] Moreover, Algeria was threatened by Libya's Scud missile systems. [103]

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[97] Declan Walsh, "Need a North Korean Missile? Call the Cairo Embassy," *The New York Times*, March 3, 2018, <https://www.nytimes.com/2018/03/03/world/middleeast/egypt-north-korea-sanctions-arms-dealing.html>

[98] Bill Gertz, "Not-So-Strange Bedfellows," *The Washington Free Beacon*, January 29, 2013, <http://freebeacon.com/politics/not-so-strange-bedfellows/>

[99] Ibid

[100] "Egypt," *NTI*, January 2015, <https://www.nti.org/learn/countries/egypt/delivery-systems/>

[101] Adam Taylor, "Egypt may be the newest front in Trump's battle with North Korea," *The Washington Post*, August 24, 2017, <https://www.washingtonpost.com/news/worldviews/wp/2017/08/24/egypt-may-be-the-newest-front-in-trumps-battle-with-north-korea/?utm_term=.89b88749512a>

[102] A Bowdoin Van Riper, "Ballistic Missiles and the Cold War, 1945-1990," *Rockets and Missiles: The Life Story of a Technology*, (USA: Greenwood Press, 2004), pp.90

[103] Ephraim Kahana and Muhammed Suwaed, "Libyan Ballistic Missiles Programme," *A-Z of Middle Eastern Intelligence*, (Toronto: The Scarecrow Press, Inc, 2009), 00.190

In 2017, there were reports that Algeria acquired the Iskander-E ballistic missile with a range of 280 kilometres and payload capacity of 400 kilograms from Russia [104] Algeria's efforts in counterinsurgency have led to the realisation of the need for sophisticated artillery systems. Over the years, Algeria has acquired self-propelled artillery systems to improve its warfighting capability against insurgents and the acquisition of tactical Iskander missiles would only bolster the strength of Algeria's artillery. [105] The missile can deliver high precision strikes on ground targets and is equipped with stealth technology and can alter its flight trajectory during its flight course to evade enemy missile defence system. The missiles are solid propelled and can be launched from TELs thus, increasing their chances of survivability. [106] Algeria was reported to be possessing the Russian Kh-35 anti-ship cruise missiles.

Sudan

According to reports, in the 1990s, Iraq had deployed Scud missiles in Sudan though such reports were denied by the latter. In 2000, there were reports that Iraq was investing US$475million to construct a missile factory in Sudan using North Korean missile technology and human resources.[107] The assembled Scuds were to be held in Sudan for the Iraqi use in case of a conflict. In 1996, it was reported that China too had provided Scud missiles to Sudan under a US$200 million loan from the Malaysian government to Sudan against future oil extraction. In return, China heavily invested in the Sudanese energy sector and bought oil reserves from Sudan. [108]

However, there are claims that Khartoum had not taken too much interest in Scuds as they were interested in combat aircraft due to the nature of threat Sudan was subjected to which included counter-insurgency operations.[109] This is also probably the reason why the Sudanese Air Force became one of the best-equipped air-force in Africa. But air power has limitations as it can be susceptible to enemy air defence.

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[104] "MENA country has acquired Iskander-E ballistic missiles," *Defence Web*, November 21, 2017, <https://www.defenceweb.co.za/land/land-land/mena-country-has-acquired-iskander-e-ballistic-missiles/>

[105] "The Slow Revolution of the Algerian Artillery," *Fighter Jets World*, March 5, 2018, <http://fighterjetsworld.com/2018/03/05/the-slow-revolution-of-the-algerian-artillery/>

[106] Martin Sieff, "Russia's Iskander is ideal weapon to hit BMD bases," *UPI*, October 3, 2008, <https://www.upi.com/Russias-Iskander-is-ideal-weapon-to-hit-BMD-bases/21841223055335/>

[107] "Saddam's rogue alliance," *The Washington Times*, April 3, 2000, <https://www.washingtontimes.com/news/2000/apr/3/20000403-011046-3402r/>

[108] John Rocha, "A New Frontier in the Exploitation of Africa's Natural Resources: The Emergence of China," in ed., Firoze Manzi and Stephen Marks, *African Perspectives on China in Africa*, (Fahamu: Nairobi, 2007), pp.75

[109] Andrea Berger, "North Korea in the Global Arms market", *Target Markets: North Korea's Military Customers in the Sanctions Era*, (London: RUSI, 2015), pp.20

In 2011, there were reports that Sudan has clandestinely struck deals with North Korea to purchase medium and short-range ballistic missiles.[110] However, in the recent past owing to North Korea's recalcitrant attitude on its nuclear weapons and missile programme, Sudan's Foreign Ministry has declared that its "defence production sector has cancelled all contracts …. with North Korea, and ended all relations, direct or through a third party."[111]

Non-State Actors

Hezbollah

Hezbollah, an Islamic militant group based in Lebanon fighting Israel reportedly possesses ballistic missiles provided by Iran. The group is believed to possess Scud-D missiles that could reach targets in Israel. The long-range ballistic missiles have been supplied to Hezbollah by Iran and Syria and most them have been disassembled and moved to Lebanon.[112] The missile arsenal also included Scud-Cs and the Fateh category missile systems.

In addition, Hezbollah also has North Korean missile systems in its arsenal and North Korea is building tunnels for Hezbollah in Lebanon for the storage of these missile systems. Facing international threat and isolation, Pyongyang economy sells weapon systems to Hezbollah in return for hard cash. The Shia militant group is believed to be receiving funds from Iran smuggled through Syria and through Hawala transactions. Under President Bashar al-Assad, the Syrian assistance to Hezbollah increased as compared to that during his father's time. Hezbollah also draws funds through bank robbery and from drug profits.[113] Moreover, the Lebanese diaspora that is settled in Africa and Latin America also provides funding to the Hezbollah.[114]

Why would Hezbollah need such weapon systems against Israel? Hezbollah initially used guerrilla tactics and terrorism against Israel but later, the group realised that if it must gain a strategic victory, it would need sophisticated rockets and missile systems that could surpass Israel's military superiority. Such a strategy had two advantages; one, Hezbollah had realised from the Iran-Iraq war how missiles and rocket systems could act as psychological weapons

[110] "Wikileaks: Sudan negotiating purchase of missiles from North Korea," *Sudan Tribune*, September 5, 2011, <http://www.sudantribune.com/Wikileaks-Sudan-negotiating,40035>

[111] "Sudan says it has cut all defence ties with North Korea," *Reuters*, June 6, 2018, https://www.reuters.com/article/us-sudan-north-korea/sudan-says-it-has-cut-all-defence-ties-with-north-korea-idUSKCN1J22BU

[112] Anne Barnard and Eric Schmitt, "Hezbollah moving long-range missiles from Syria to Lebanon, an Analyst Says," *The New York Times*, January 2, 2014, <https://www.nytimes.com/2014/01/03/world/middleeast/hezbollah-is-said-to-transfer-missiles.html>

[113] Yaya J. Fanusie and Alex Entz, "Hezbollah: Financial Assessment," *Foundation for Defense of Democracies*, September 2017, <https://s3.us-east-2.amazonaws.com/defenddemocracy/uploads/documents/CSIF_TFBB_Hezbollah.pdf>

[114] Ibid

and weapons of terror; and two, acquiring such weapon systems burdens Israel to develop a sophisticated missile defence system to protect its territory from rocket and missile attacks. The latter led to incurring of cost on a missile defence system that could have otherwise been utilised for an offensive strategy.

In the recent past, reports emerged that Hezbollah has been building missile factories in Lebanon. These efforts are being undertaken to uplift Hezbollah's core goal, namely, preserving the military content that it terms to be "resistance priority." [115]

In 2017, reports emerged that Hezbollah has acquired sophisticated Russian Yakhont anti-ship cruise missiles. These missiles have a range of 300 kilometres that can become a threat to Israeli Navy.[116] The cruise missile can render missile defence ineffective and can threaten Israeli newly built oil and rigs in the Mediterranean Sea.

Hamas

Hamas is believed to have acquired ballistic missiles from Iran which included the Fajr missiles.[117] In the past, the IRGC had admitted that it had provided Hamas with the technological know-how to develop Fajr missiles. Not only Iran, but North Korea too is a supplier of missile technology to Hamas and have reportedly provided the organisation with short-range missile systems in return for cash down payment.[118] The Palestinian militant group's interest in missile capabilities was due to the emergence of the new ground warfare concept within Hamas that focused on attacking enemy through tunnels to ensure command and control, combat and incursions into the Israeli territory. Hamas over the years developed a pro-active approach in warfare that led to the acquiring of rockets and missile systems. [119]

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[115] See Nicholas Blanford, "Hezbollah's Evolution: From Lebanese Militia to Regional Player," *Middle East Institute,* Policy Paper No.4, November 2017, <https://www.mei.edu/sites/default/files/publications/PP4_Blanford_Hezbollah.pdf>

[116] "Hezbollah Acquired advanced Russian Yakhont missiles with a 300km range," *Ya Libnan,* February 27, 2017, <http://yalibnan.com/2017/02/27/hezbollah-acquired-advanced-russian-yakhont-missiles-with-a-300-km-range/>

[117] Saeed Kamali Dehghan, "Iran supplied Hamas with Fajr-5 missile technology," *The Guardian,* November 21, 2012, <https://www.theguardian.com/world/2012/nov/21/iran-supplied-hamas-missile-technology>

[118] Bruce E. Bechtol, Jr, "North Korea's Illegal Weapons Trade: The Proliferation Threat from Pyongyang," *Foreign Affairs,* June 6, 2018, <https://www.foreignaffairs.com/articles/north-korea/2018-06-06/north-koreas-illegal-weapons-trade>

[119] Dana Preisler- Swery, "The Last Missile War? The Influence of the "Iron Dome" on the operational concepts of Hamas, Hezbollah and the IDF," *The Dado Centre Journal,* Vol.4, <https://www.idf.il/media/11775/preisler-swery.pdf>

Hamas had indigenously developed an 80-kilometre long-range missile called the M-75 using Iranian technology. Both Fajr and M-75 missiles have been fired at Israel including Tel Aviv.[120]

Islamic State in Iraq and Syria (ISIS)

In March 2014, there were reports that the ISIS is in possession of Scud missiles which would have been captured when the organisation had vast areas of Iraq under its control. An ISIS member was also reported to have said that the missile was a threat to Israel given the group's increased presence in Gaza in 2014.[121]

[120] Chana Ya'ar, "Hamas Manufactures Longer Range M-75 Missiles," *Arutz Sheva,* November 25, 2012, <https://www.israelnationalnews.com/News/News.aspx/162492>

[121] Dalit Halevy, "ISIS parades Scud Missile 'Heading Toward Israel'," *Arutz Sheva,* July 1, 2014, <https://www.israelnationalnews.com/News/News.aspx/182409>

3. Technology Control Regime

Missile development in the MENA region made the region more unstable and most of these countries developing ballistic and cruise missiles are also capable of developing nuclear weapons and some even possess chemical and biological warheads. Countries like Israel are believed to have 'bombs in the basement' while there are reports that Saudi Arabia has a deal with Pakistan to acquire nuclear weapons when needed. At the same time, tensions surmounting Iranian nuclear weapons were put to rest in 2015 when the final Joint Comprehensive Plan of Action (JCPoA) came into being that restricted any scope for Iran to develop nuclear weapons by restricting both the enriched uranium as well as the plutonium path.[122]

However, in 2018, President Donald Trump pulled the US from the nuclear deal and this could prove detrimental to the stability of the Middle East. Without the nuclear deal, Iran would be eligible to acquire sophisticated technologies that could enable it to pursue its nuclear option.

Effort is made to make region of the Middle East a Nuclear Weapons Free Zone (NWFZ) while countries like Jordan have also pledged to work towards a Weapons of Mass Destruction (WMD) Free region. The Missile Technology Control Regime (MTCR) prohibits the proliferation of ballistic and cruise missiles. The same relates to the Proliferation Security Initiatives (PSI) that prohibits illicit proliferation of WMD, their delivery systems, and other related materials. The UN Security Council Resolutions especially Resolution 2231 imposed on Iran forbids the development and use of missiles in certain countries suspected of indulging in proliferation activities and at times, this prohibition is also applicable to non-state actors. There are conventions banning chemical and biological weapons that are relevant for the Middle East. These conventions include Chemical Weapons Convention and Biological Weapons Convention. Some countries are believed to have chemical and biological weapons despite being parties to these conventions.

In addition, some of the Middle Eastern countries are developing missile defence systems or acquiring the same from friendly foreign countries to reduce the deterrent capability of adversaries with ballistic missiles capabilities.

This chapter, therefore, deals with the technology control regimes that exist at the global level aimed at prohibiting WMD and their delivery systems and effectiveness of the non-proliferation mechanisms in controlling the spread of missiles and WMD in the Middle East and the nuances attached to these mechanisms.

Nuclear Non-Proliferation Treaty (NPT), 1968

The NPT is a treaty aimed at preventing member states from acquiring nuclear weapons through proliferation. Under Article VI of the Treaty member states could pursue nuclear energy programme as a right to be a signatory of the NPT and states should work towards disarmament. One of the objectives of the 1995 NPT Review Conference was to ensure that state parties in the Middle East would abide by the treaty and refrain from developing nuclear

[122] "Joint Comprehensive Plan of Action (JCPOA) at a Glance," *Arms Control Association*, May 2018, <https://www.armscontrol.org/factsheets/JCPOA-at-a-glance>

weapons and adhere to international non-proliferation treaties and regimes. Many proliferation challenges and issues of compliance remain a concern as the MENA region grows more unstable.

In 2002, the National Council of Resistance of Iran (NCRI), an exiled group, claimed that the Islamic Republic was developing nuclear weapons. The country possessed both centrifuge technology as well as heavy water reactors that could enable Tehran to develop nuclear weapons either through enriched uranium or through the plutonium path. Nuclear weapons pursuit through the plutonium path would have been difficult since its lack of technology to reprocess spent fuel, but the centrifuge route was a possibility.

In addition, the development of long-range ballistic missiles that Iran acquired through various sources and indigenous efforts added a concern for the world order that Iran can arm its ballistic missiles with nuclear weapons. Tehran also ventured into multiple re-entry vehicles (MRV) that further raised concerns that it could master the process of miniaturisation of nuclear warheads.

All these issues brought the NPT into a test. The Treaty had to prevent any nuclear weapons development in Iran, but it also had to uphold the provisions of the NPT that provides member states the right to continue a peaceful nuclear energy programme. Iran was a party to the NPT, and hence, it claimed its right to pursue nuclear energy programme under Article VI.

Various Iranian leaders including President Hassan Rouhani assured the world that Iran did not believe in developing nuclear weapons due to religious considerations that prohibit it from developing WMD.[123] But the concern over Iran's peaceful nuclear programme having a 'possible military dimension' (PMD) could never be ruled out despite such assurance.

The NPT does not deal with the issue of missile development programmes and hence, the possibility of a nuclear energy programme converted into nuclear weapons programme clandestinely and delivered by ballistic missiles do not fall under the purview of the NPT. Ballistic missiles are not the best weapon systems to deliver chemical and biological warheads due to their high re-entry speed but are best suited to deliver nuclear warheads and this adds to a country's prowess and prestige.

Turkey is a party to the NPT but hosts US TNWs on its territory since the Cold War days. Criticisms have been levelled over Turkish commitments to the NPT in the light of the presence of the TNWs.[124] The dual capability of the F-16s and prospective F-35s implies that these aircraft are also capable of delivering TNWs.

Following the failed coup of July 2016,Turkey has become more apprehensive of the US. In the recent years it had also moved away from NATO countries and in the recent past even

[123] "Rouhani says Iran will not acquire nuclear weapons 'on principle," *The Guardian*, March 1, 2014, <https://www.theguardian.com/world/2014/mar/01/rouhani-iran-nuclear-weapons-principle>

[124] "Nuclear Disarmament NATO," *NTI*, February 17, 2010, <https://www.nti.org/analysis/articles/nato-nuclear-disarmament/>

sought for missile defence system from China.[125] When this deal with China failed to materialise, Ankara sought to acquire the S-400 Triumph air and missile defence system from Russia. Such developments indicate its loss of faith in NATO and probably could lose confidence in the US extended nuclear deterrence strategy. Turkey is desirous of obtaining long-range ballistic missiles which in turn has increased concerns about Turkey resorting to indigenous nuclear weapon development.[126]

Saudi Arabia is party to the NPT, but reports published in 2013 indicated that the Kingdom could acquire nuclear weapons from Pakistan due to its past investments in the latter's nuclear programme. The bilateral understanding would ensure that nuclear weapons would be provided to Saudi Arabia when needed.[127] The Crown Prince and Defence Minister Mohammed Bin Sultan had stated, "Saudi Arabia does not want to acquire any nuclear bomb, but without a doubt, if Iran developed a nuclear bomb, we will follow suit as soon as possible." [128] However, being a party to the NPT, it would be difficult for Riyadh to acquire nuclear weapons from a non-NPT state like Pakistan.[129]

Israel is not a party to the NPT but is believed to be possessing nuclear arsenal which it neither confirms nor denies.[130] Israel has always supported the NWFZ concept in the Middle East but has refrained from negotiating such arrangements because it wants such a zone only when there is comprehensive peace in the region.[131] However, this support for the NWFZ had partly inhibited Israel from declaring itself as a state possessing nuclear weapons capability.

Egypt has been vocally critical about the Treaty though it signed and ratified the same in the 1960s and 1980s respectively. It has been supportive of the NPT-led NWFZ in the Middle East but has been critical of Israel's non-accession to the NPT which stalled the progress of the NWFZ. During the Iranian nuclear impasse, expressing his support for the NWFZ, Egypt's Ambassador to the UN Maged Abdelaziz stated, "success in dealing with Iran will depend to a

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[125] "For China, Turkey Missile Deal is a victory," *World Bulletin,* October 2, 2013, <https://www.worldbulletin.net/article-comment/for-china-turkey-missile-deal-a-victory-h119631.html>

[126] Rebecca Flood, "Turkey is trying to get an atomic bomb in secret weapons plans, warns expert," *Express,* August 8, 2017, <https://www.express.co.uk/news/world/838694/Turkey-atomic-bomb-Recep-Tayyip-Erdo-an-nuclear-weapon-fears>

[127] Mark Urban, "Saudi nuclear weapons 'on order' from Pakistan," *BBC News,* November 6, 2013, <https://www.bbc.com/news/world-middle-east-24823846>

[128] Thomas W. Lippman, "Saudi Arabia and the Nuclear Temptation," *Lobe Log,* April 13, 2018, <https://lobelog.com/saudi-arabia-and-the-nuclear-temptation/>

[129] Debalina Ghoshal, "Riyadh's Nuclear Game," *RUSI Newsbrief,* May 2014, <file:///C:/Users/PC1/Downloads/201405%20NB%20Ghoshal.pdf>

[130] "Israel," *NTI,* Last Updated July 2017, <http://www.nti.org/learn/countries/israel/>

[131] Ibid

large extent on how successfully we deal with the establishment of a nuclear weapons-free zone" in the Middle East and expressed his annoyance at the presence and pursuit of nuclear weapons by Iran or Israel.[132]

Both Egypt and Turkey have been critical of Israel's nuclear weapons programme, and there are also widespread criticisms on Israel's air strikes on targets believed to linked to nuclear weapon programmes in Iraq and Syria. [133]

Both Israel and Egypt have been tussling over the NWFZ and the latter proposes that all states including Israel should become a party to the NPT to make NWFZ a success. Israel, on the other hand, has been arguing that the NWFZ would become the basis of showcasing Israel's attempt to non-proliferation despite its opposition to the NPT. For Israel, NWFZ is the alternative approach to the NPT. [134]

Algeria ratified the NPT in only 1995 but in 1991 there were reports that it was acquiring nuclear capability from China. Even though it was believed to be associated with nuclear energy, some thought that the deal could enable Algeria to pursue the weaponisation option amid threats from Libya.[135] However, since both the countries—Algeria and China—were NPT members, it was widely recognised that they had the right to cooperate with one another on nuclear technology for peaceful purpose.

Prior to signing the NPT, in 1991, the US suspected that the El Salam nuclear reactor in Algeria was carrying out nuclear weapons programme as the heavy water moderator reactor could produce three to five kilograms of plutonium sufficient for a bomb. Suspicion increased when the Soviet-made SA-5 surface-to-air missile battery was deployed to protect the nuclear facility.[136] However, in 1995, after Algeria joined the NPT, it allowed the IAEA to inspect its nuclear facility. In addition to the NPT, in 1996, Algeria also joined the Pelindaba Treaty[137] under which African countries pledged for an NWFZ.

Chemical Weapons Convention, 1997

[132] Louis Charbonneau, "Iran, Egypt ready for battle at U.N. nuclear meeting," *Reuters,* April 29, 2010, <https://www.reuters.com/article/us-nuclear-treaty-idUSTRE63S0GW20100429>

[133] Toni Johnson, "The Four Nuclear Outlier States," *Council on Foreign Relations,* May 19, 2010, <https://www.cfr.org/backgrounder/four-nuclear-outlier-states>

[134] Avner Cohen, "Israel: Reconstructing a Black Box," *Biological Warfare and Disarmament: New problems and New Perspectives,* in ed., Susan Wright (XXXX: Rowman and Littlefield, 2002), pp.197.

[135] Elaine Sciolino and Eric Schmitt, "Algerian Reactor Came from China," *The New York Times,* November 15, 1991,< https://www.nytimes.com/1991/11/15/world/algerian-reactor-came-from-china.html>

[136] "Algeria Special Weapons," *Federation of American Scientists,* <https://fas.org/nuke/guide/algeria/index.html>

[137] "Algeria," *NTI,* Updated April 2018, <https://www.nti.org/learn/countries/algeria/>

The Chemical Weapons Convention (CWC) came into force in 1997 and this bans not only the use of chemical weapons but also the possession of chemical weapons. While most countries in the Middle East are parties to the CWC, Israel signed the CWC but has not ratified it. Egypt has not yet signed the CWC.

Iran has been a party and its Foreign Ministry had stated, "Iran is opposed to the use of chemical weapons on the basis of religious, legal, and ethical standards."[138] However, according to *Federation of American Scientists* report, Iran continues to expand its chemical weapons programme and infrastructure.[139]

On the other hand, after agreeing to renounce WMD, Libya agreed to convert its Scud-B missiles into shorter range and less powerful systems that could be used only for a defensive purpose.[140] However, initially, Libya refused to agree to accede to the CWC but joined it when felt threatened by US President George Bush's aggression in Iraq.

Again, Iraq was reported to have possessed chemical weapons and it had worked to improvise the range and accuracy of the Scud-Bs and the Cs to deliver chemical weapons. The accuracy of missiles is required when the ballistic missile is used to deliver chemical, biological or nonconventional warheads. In 1991, Scud missiles armed with chemical weapons were fired at Saudi Arabia.[141] As already mentioned, Saddam Hussein regime had used chemical agents like nerve gas and mustard gas against Iran during the Iran-Iraq war in the 1980s killing approximately 7500 Iranian military and civilians.[142] In 1988, chemical weapons were used by Iraq in Halabja which was home to Iraqi Kurds. The major reason for attacking the Kurds was that they had joined Iranian forces in fighting the Saddam forces.[143] In fact, the US then knew about the launch of chemical weapons by Saddam Hussein but did not do much to prevent such acts. In fact, according to reports, US intelligence officials had conveyed to Iraq the location

[138] "Iran Reacts Harshly to Missile Strike on Syria," *Radio Farda*, April 14, 2018, <https://en.radiofarda.com/a/iran-reactions-to-syria-missile-attack/29167703.html>

[139] "Chemical Weapons," *Federation of American Scientists*, <https://fas.org/nuke/guide/iran/cw/index.html>

[140] Judith Miller, "US Says Libya Will Convert Missiles to Defensive Weapons," *The New York Times*, April 11, 2004, <https://www.nytimes.com/2004/04/11/world/us-says-libya-will-convert-missiles-to-defensive-weapons.html>

[141] Jonathan B. Tucker, "Evidence Iraq used chemical weapons during the 1991 Persian Gulf War," *The Non-Proliferation Review*, Spring-Summer 1997, <https://www.nonproliferation.org/wp-content/uploads/npr/tucker43.pdf>

[142] Ted Regencia, "Chemical Attacks on Iran: When the US looked the other way," *Al Jazeera*, April 19, 2018, <https://www.aljazeera.com/news/2018/04/chemical-attacks-iran-180415122524733.html>

[143] Ibid

of the Iranian forces aiding the attack. [144] It was only in 2007 that the country acceded to the Convention.

Egypt possesses chemical weapons and was believed to have used them during 1963-1964 when it was involved in the Yemeni Civil War. Egypt also possessed ballistic missiles. Egypt refused to accede to the CWC because Israel did not accede to the NPT. This means that Egypt probably has kept its options of using chemical warheads open should Israel resort to nuclear weapons. Egypt is a signatory to the NPT that prevents the country from developing nuclear weapons. Its adversary, Israel, on the other hand with adheres to bombs-in-the-basement posture is a threat. Israel is not a party to the NPT and possesses chemical weapons. Hence, Egypt feels chemical weapons as a viable \ option to deter Israel's unconventional deterrent capabilities.

Israel's chemical and biological weapons programmes are shrouded in secrecy as part of its deterrent posture against the threats from adversaries. Critiques like Avner Cohen has suggested that Israel must accede to the CWC as the chemical weapons threat to Israel that existed during Saddam Hussein's regime no longer exists.[145] The fact that Israel has not yet ratified the CWC indicates that chemical weapons are still useful for strengthening Israeli deterrence.

Turkey is a party to the CWC but in the recent past, it has been accused of using chemical weapons against Kurdish fighters in February 2018 in Afrin, though denied by Turkey as "baseless accusations"[146] Syrian news agency SANA has confirmed that Turkey had used poisonous gas.[147]

There are also reports that the Assad regime in *Syria* is using chemical weapons against its population. Damascus joined the CWC only in 2013 but is believed to possess chemical weapons stockpile that are being used against rebels.[148] Syria is reported to have received

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[144] Shane Harris and Matthew M. Aid, "Exclusive CIA Files Prove America Helped Saddam as he gassed Iran," *Foreign Policy,* August 26, 2013, <https://foreignpolicy.com/2013/08/26/exclusive-cia-files-prove-america-helped-saddam-as-he-gassed-iran/>

[145] Avner Cohen, "Israel and Chemical/ Biological Weapons: History, Deterrence, And Arms Control," *The Non-Proliferation Review,* Fall 2001, <https://www.nonproliferation.org/wp-content/uploads/npr/83cohen.pdf>

[146] "Turkey denies use of chemical weapons in Syria's Afrin, says accusations baseless," *Reuters,* February 17, 2018, <https://www.reuters.com/article/us-mideast-crisis-syria-turkey-afrin/turkey-denies-use-of-chemicals-in-syrias-afrin-says-accusations-baseless-idUSKCN1G10G8>

[147] Umut Uras, "Turkey officials deny use of chemical weapons in Afrin," *Al Jazeera,* February 18, 2018, <https://www.aljazeera.com/news/2018/02/turkey-denies-chemical-weapons-syria-afrin-180218082237109.html>

[148] Scott Shane, "Weren't Syria's Chemical Weapons Destroyed? It's Complicated," *The New York Times,* April 7, 2017, <https://www.nytimes.com/2017/04/07/world/middleeast/werent-syrias-chemical-weapons-destroyed-its-complicated.html>

shipments from North Korea that contained chemical weapons and ballistic missile components during 2012-2017.[149] The MaRV Scud-D programme that North Korea was reportedly assisting Syria in is to improve the accuracy of the ballistic missiles.[150] This was probably being done to make the missiles capable of delivering chemical warheads to targets accurately in the light of the Syrian Crisis. Since ballistic missiles are not the best options for delivering chemical warheads, improving accuracy of the missile is conducive for effective delivery of the warheads. The chemical warheads are stored in various facilities dispersed across different parts of the country.[151]

However, proliferation concerns are not only confined to state actors possessing chemical weapons despite being parties to CWC. Non-state actors make the implementation of the CWC in the region even more complex process and the Convention would not be applicable to them. The *ISIS*, for instance, is reported to be in possession of chemical weapons. According to reports, there has been assistance from a French national called Joe Asperman who worked as a senior chemical weapons expert for ISIS. He was in charge of the chemical weapons production within Syria and the deployment of these chemical weapons at the battlefront.[152] Even though some claim that the Scud that has been acquired by ISIS is a dud missile and is not operable, the ISIS might collaborate with North Korea to develop such missile systems to deliver chemical warheads.[153]

Some of the chemical weapon stockpiles in Syria were also transferred to Hezbollah.[154] In 2013, there were reports, Hezbollah has built a number of bases in Lebanon for long range missiles that can carry chemical warheads.[155] Considering IRGC and its support for the

[149] Zachary Keck, "North Korea and Syria: A Chemical Weapons and Missile Dynamics Duo," *The National Interest*, March 16, 2018, <http://nationalinterest.org/blog/the-buzz/north-korea-syria-chemical-weapons-missiles-dynamic-duo-24959>

[150] "North Korea Arming Syria with Chemical Weapons, Ballistic Missiles, Secret UN Report Claims," *Ha'aretz*, February 28, 2018, <https://www.haaretz.com/middle-east-news/syria/secret-un-report-north-korea-arming-syria-with-chemical-weapons-1.5863797>

[151] "Syria's Chemical Weapons Stockpile," *BBC News*, January 30, 2014, <https://www.bbc.com/news/world-middle-east-22307705>

[152] "State Department Terrorist Designation of Joe Asperman," *U.S. Department of State*, March 22, 2018, <https://www.state.gov/r/pa/prs/ps/2018/03/279453.htm>

[153] The inference is drawn based on North Korean involvement with asymmetric organisations like Hamas and Hezbollah in return for hard cash.

[154] Gideon Kouts, "Former Syrian General: Hezbollah is in Possession of chemical weapons," *The Jerusalem Post*, March 8, 2018, <https://www.jpost.com/Middle-East/Former-Syrian-official-to-Maariv-Hezbollah-has-chemical-weapons-544567>

[155] Jack Khoury, "Hezbollah has long range chemical weapons," Says Lebanese MP," *Haaretz*, October 6, 2013, <https://www.haaretz.com/.premium-hezbollah-missiles-can-carry-chemicals-1.5345592>

Hezbollah,[156] one could confidently conclude that IRGC may help Hezbollah build bases in Lebanon. In 2013, there were reports, Khaled Zaher of the anti-Hezbollah al-Mustaqbal party had declared that Syria had provided long-range missiles to Hezbollah that can carry the chemical warheads and this transfer was done under the supervision of IRGC and that the missiles are deployed in regions not easily accessible and are directly under the command of Hezbollah.[157]

Such reports complicate non-proliferation mechanisms. While the CWC can be applicable to Syria and the latter could be punished for this irresponsible act, the convention does not hold any significance Hezbollah as these organisations cannot be tried for any 'breach' of convention. Nevertheless, as regards the chemical weapons threat from state actors like Syria and Libya in the MENA region, the UNSC has unanimously adopted the Resolution 2235 in 2015 which established a mechanism to identify perpetrators of chemical weapons in Syria[158] while the Resolution 2298 in 2016 sought to control and destroy Libya's chemical weapons.[159]

States that hold greater influence in global politics can afford to resort to the destruction of the chemical weapons facilities of states that are suspected to be indulging in proliferation activities. For instance, it is believed that that in 2018- the US bombed the chemical weapons facilities in Syria, including the Barzeh Research and Development Centre in the greater Damascus area and Him Shinshar chemical weapons storage complex located West of Homs, a city north of Damascus, and this had pushed back the Syrian chemical weapons programme by many years.[160] During the civil war there has been a barrage of missile strikes on Syria by French, British and American forces to halt the Assad regime's chemical weapons programme as there were reports that Syria has been possessing Sarin and chlorine to name a few and has delivery systems for their dispersal.[161] France and Britain justified their actions by stating that

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[156] Ibid

[157] Lazar Berman and Elhanan Miller, "Hezbollah's long-range missiles can carry chemical weapons," *The Times of Israel,* October 6, 2013, <https://www.timesofisrael.com/hezbollah-missiles-can-deliver-chemical-weapons/>

[158] "Security Council Unanimously adopts resolution 2235, Establishing Mechanism to Identify Perpetrator Using Chemical Weapons in Syria," *United Nations,* August 7, 2015, <https://www.un.org/press/en/2015/sc12001.doc.htm>

[159] "Adopting Resolution 2298 (2016), Security Council Authorises Member States To Control, Destroy Libya's Chemical Weapons," *United Nations,* July 22, 2016,< https://www.un.org/press/en/2016/sc12455.doc.htm>2002

[160] Jenny Gathright, "Syrian Chemical Weapons Sites Before and After Missile Strikes," *National Public Radio,* April 14, 2018, <https://www.npr.org/sections/thetwo-way/2018/04/14/602550478/images-show-3-syrian-chemical-weapons-sites-before-and-after-missile-strikes>

[161] Thomas Gibbons Neff, "Missile strikes are unlikely to stop Syria's chemical attacks, Pentagon says," *The New York Times,* April 19, 2018, <https://www.nytimes.com/2018/04/19/world/middleeast/syria-strikes.html>

the severe action was necessary as Syria had crossed the line in using chemical weapons despite being a party to the CWC since 2013.[162]

Regarding Saudi Arabia, there is no evidence to suggest that it possesses biological or chemical weapons. The Kingdom has had immense financial and technological infrastructure to manufacture chemical and biological weapons especially as threats from Iraq was imminent and was prone to chemical or biological attack during the Gulf War of 1990-91.[163] It was initially assumed that Saudi Arabia might develop chemical warheads for the CSS-2 missiles that it had acquired from China. There are also reports that Saudis have used chemical weapons in Yemen.[164] This is a concern as Saudi Arabia is a party to the CWC and a domestic law in 2005 prohibits the kingdom from producing, possessing and storing chemical weapons.[165] There were also reports that Egypt, Syria, Iran, and Sudan have also procured chemical and biological weapons.[166] In fact, during the North Yemen Civil War from 1962-1970, Egypt had used chemical weapons during its involvement from 1963-1967 and also refuses to participate in CWC. [167] Despite being a party to the CWC, in 2018, reports emerged that the US accused Iran of failing to declare the facilities and equipment required to develop these weapons. [168]

Biological Weapons Convention (BWC), 1975

The BWC is a legally binding treaty that came into force in 1975. Though the BWC has one hundred and eighty parties, it must be noted that Middle Eastern countries like Egypt and Syria have only signed the treaty but not had ratified it while Israel had not even signed the treaty.[169]

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[162] Avner Cohen, "Israel Must Sign the Chemical Weapons Convention," *Haaretz,* April 17, 2018, <https://www.haaretz.com/opinion/.premium-israel-must-sign-the-chemical-weapons-convention-1.6009076>

[163] Dany Shoham, "Does Saudi Arabia have or seek chemical or biological weapons," *Non-Proliferation Review*, Spring/Summer 1999, <https://www.nonproliferation.org/wp-content/uploads/npr/shoham63.pdf>

[164] Thomas Gibbons Neff, "Saudi Arabia Appears to be using U.S.- supplied white phosphorus in its war in Yemen," *The Washington Post,* September 19, 2016, <https://www.washingtonpost.com/news/checkpoint/wp/2016/09/19/saudi-arabia-appears-to-be-using-u-s-supplied-white-phosphorus-in-its-war-in-yemen/?utm_term=.f14e7ac720a9>

[165] "Saudi Arabia," *NTI,* Updated July 2017,< https://www.nti.org/learn/countries/saudi-arabia/>

[166] "Egypt," *NTI,* Last Updated September 2015,< https://www.nti.org/learn/countries/egypt/>

[167] Ibid

[168] Nicole Gaouette and Elise Labott, "US set to accuse Iran of violating chemical weapons treaty," *CNN*, November 19, 2018, <https://edition.cnn.com/2018/11/19/politics/us-iran-chemical-weapons-violation/index.html>

[169] Daryl Kimball, "The Biological Weapons Convention (BWC) at a glance," *Arms Control Association,* February 2018, <https://www.armscontrol.org/factsheets/bwc>

Israel has justified its stance on the grounds that it cannot adhere to any WMD regimes unless the political stability in the region is ensured and there is confidence building in the region. This posture has attracted many criticisms from its rivals. According to reports, the US supplied Harpoon missiles to Israel which could be used to deliver nuclear warheads[170] and hence, it could also be modified in a way to enable them to carry chemical and biological warheads. Cruise missiles are the best delivery mechanisms for chemical and biological warheads due to their slow re-entry speed.

Iraq developed biological weapons during the 1980s. In 1988, the main Al-Hakam weapons facility commenced research on biological weapons in addition to the Al Salman facility. Some of the noteworthy developments were the clostridium perfringens as well as Aflatoxin. Iraq also produced Ricin that could be used in 155mm artillery shells. During the invasion of Kuwait, the Iraqi biological weapons programme accelerated, and botulinum, anthrax, and aflatoxin were choices for its weaponisation. [171]

According to the CSIS report, a Scud missile with a botulinum warhead could contaminate an area of 3,700 square kilometres. Thirteen Al Hussain missiles with biological warheads were deployed in the 1990s. These missiles contained warheads like anthrax that could kill 60,000,000 people.[172] These developments happened despite Iraq being a signatory to the BWC. However, it was only in 1991 that it ratified the BWC after it agreed to abide by the UN Security Council Resolution 687.[173] The biological weapons appeared more attractive for Iraq because despite receiving considerable foreign assistance for its nuclear technology programme, Iraq hardly made any progress with nuclear weapons. On the other hand, with minimal assistance, it had a robust biological weapons programme and these weapons fitted with ballistic missiles were even deployed during Operation Desert Storm as a deterrent.[174]

Though many MENA states are parties to the BWC, there are concerns about their capability to develop biological weapons. For instance, in 2008, the US Director of National Intelligence (ODNI) mentioned, "Iran probably has the capability to produce large quantities of some Biological warfare agents for offensive purposes, if it had made the decision to do so. Iran continues to seek dual-use biotechnology materials, equipment, and expertise consistent with its growing legitimate biotechnology industry but these components could advance Tehran's

[170] "Arms Control and Proliferation Profile," *Arms Control Association,* July 2018, <https://www.armscontrol.org/factsheets/israelprofile>

[171] Anthony H. Cordesman, "Iraqis Past and Future Biological Weapons Capabilities," *CSIS Middle East Dynamics Net Assessment,* February 1998, <https://csis-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/media/csis/pubs/iraq_bios.pdf>

[172] Ibid

[173] The Resolution demanded that Iraq allowed the United Nations Special Commission (UNSCOM) and International Atomic Energy Agency (IAEA) to inspect those facilities in Iraq believed to be related to WMD production.

[174] Zilinskas RA, "Iraq's Biological Weapons: The Past as Future," *NCBI,* August 6, 1997, <https://www.ncbi.nlm.nih.gov/pubmed/9244334>

BW capability."[175] It is not surprising that a country which has been a victim of chemical and biological weapons attack by Iraq during the Iran-Iraq war would pursue biological weapons programme.

Iran's Shahab category missiles can carry chemical, biological and nuclear warheads.[176] This, in turn, raises other complications. A state that became a party to the BWC and the CWC continued to develop weapon systems that can deliver such warheads.

Sub-munitions (chemical and biological) have also emerged as a choice for Middle East countries as they allow larger room for dispersion and the missiles carrying them are not easily intercepted. Iran has also ventured into Soumar cruise missiles that would be most suitable to deliver chemical and biological warheads and sub-munitions. In 1998 an official in the Iranian mission to the United Nations Gholamhossein Dehghani, "categorically rejected" that Iran was working on germ warfare and stated: "We do not believe that having such weapons increases our security."[177] Iran has the capability to produce biological agents and may have restricted their biological warfare capability to research and development stage rather than seeking to weaponise them.[178]

On the other hand, Israel has not even signed the BWC and there is also no policy statement on biological weapons and their potential use by Israel. Despite not having signed the NPT, at least the Israeli government had a stated policy on the use of nuclear weapons and maintained that Israel "will not be the first to introduce nuclear weapons to the Middle East."[179] For Iraq, the biological weapons were almost serving as a strategic deterrent against Israel's nuclear capability.[180]

While states like Iraq viewed biological weapons as deterrent against nuclear weapons of adversaries like Israel, Turkey is believed to have refrained from pursuing such programmes. Turkey perhaps does not feel the relevance of biological warheads because it hosts US TNWs on its territory.

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[175] "Iran's Biological chronology," *NTI,* Updated July 2008, <http://www.nti.org/media/pdfs/iran_biological.pdf?_=1316555685>

[176] "Iran," *NTI,* July 2017, <https://www.nti.org/learn/countries/iran/delivery-systems/>

[177] Judith Miller and William J. Broad, "The Germ Warriors: A special report.; Iranians Bioweapons in Mind, Lure Needy Ex-Soviet Scientists," *The New York Times,* December 8, 1998, <https://www.nytimes.com/1998/12/08/world/germ-warriors-special-report-iranians-bioweapons-mind-lure-needy-ex-soviet.html>

[178] "Chemical and Biological Weapons Status at a Glance," *Arms Control Association,* June 2018, <https://www.armscontrol.org/factsheets/cbwprolif>

[179] Avner Cohen, "Israel and Chemical/ Biological Weapons: History, Deterrence and Arms Control," *Non-Proliferation Review,* Fall-Winter 2001, <https://www.nonproliferation.org/wp-content/uploads/npr/83cohen.pdf>

[180] Ibid.

Saudi Arabia is a party to BWC but in 2015, Secretary of Iran's Supreme National Security Council, Ali Shamkhani accused the Kingdom of using weapons containing toxic and pathogenic gases in the air and missile strikes in Yemen.[181]

Wassennar Arrangement (WA), 1996

This Arrangement was formally established in 1996 and is a voluntary export control regime whereby member states exchange information regarding the transfers of conventional weapons and dual-use goods and technologies under which missiles and missile systems are also discussed.[182] Turkey is a member of the WA. Participants of the WA have national policies banning arms and related exports to countries like Iran, Libya, and Iraq in the region.[183] Many big arms exporters like Israel, China, and Belarus, are not members of the WA and China as is known to have transferred weapon systems to countries in the MENA.[184] Israel on the other hand, though not a party to the WA, has its domestic export control regime in compliance with the WA.

Nuclear Suppliers' Group (NSG) founded in 1974

NSG is a group of nuclear supplier countries that seeks to contribute to the non-proliferation by implementing guidelines for nuclear and nuclear-related exports.[185] From the Middle East, Turkey is a member of the NSG. Israel on the other hand, is not a member of the NSG because it had not signed the NPT. However, some claim that Israel is, "adhering" to the guidelines of the NSG and wants to be recognised to other NSG members as an adherent country "on the

[181] "Iran's Top Security Official: S. Arabia Using Biological Weapons in Yemen," *FARS News Agency*, October 6, 2015, <http://en.farsnews.com/newstext.aspx?nn=13940714001218>

[182] There are forty two participating states including Argentina, Australia, Austria, Belgium, Bulgaria, Canada, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, India, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Ukraine, United Kingdom and United States other than Turkey.

[183] Richard F. Grimmet, "Military Technology and Conventional Weapons Exports Control," *CRS Report for Congress*, September 29, 2006, <https://fas.org/sgp/crs/weapons/RS20517.pdf>

[184] Andrew Scobell and Alireza Nadel, "China in the Middle East: The Wary Dragon," *RAND Corporation*, 2016, <https://www.rand.org/content/dam/rand/pubs/research_reports/RR1200/RR1229/RAND_RR1229.pdf>

[185] The members are Argentina, Australia, Austria, Belgium, Bulgaria, Brazil, Canada, China, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Kazakhstan, Republic of Korea, Latvia, Lithuania, Luxembourg, Malta, Mexico, Netherlands, New Zealand, Norway, Poland, , Romania, Russia, Slovakia, Slovenia, South Africa, South Korea, Spain, , Sweden, Switzerland, Turkey, Ukraine, United Kingdom and United States

strength of the justified truth that Israel is a responsible state."[186] But NSG members like South Africa have not accepted this claim.[187]

Saudi Arabia on the other hand, though is a member of the NPT, it is not a member of the NSG. It has also expressed interest to enrich uranium and reprocess spent fuel as a part of its nuclear energy programme.[188] This has delayed nuclear technology cooperation between the US and Saudi Arabia despite the latter being a party to the NPT. The US 'gold standard' demands that those states with whom the US would pursue nuclear technology cooperation with, should refrain from pursuing uranium enrichment and reprocessing spent fuel. Saudi Arabia is unwilling to accept this rule.[189]

Despite Egypt not being a member of the NSG, it has managed to strike nuclear cooperation deals with China and Russia-both party to the NSG.[190] Jordan has availed of Chinese and Russian cooperation for its nuclear energy programme.[191]

Additional Protocol, 1990s

The Additional Protocol (AP) is a legal document that was negotiated between the IAEA and the individual state that grants further authority to the former in terms of monitoring and verifying the state's nuclear programme under the Comprehensive Safeguards Agreement.[192]

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[186] Fredrik Dahl, "Nuclear export group debates ties with Israel: document," *Reuters,* April 14, 2014, <https://www.reuters.com/article/us-nuclear-trade-israel/nuclear-export-group-debates-ties-with-israel-document-idUSBREA3D0T320140414>

[187] Ibid

[188] Steven Mufson, "Why does Saudi Arabia want to spend billions to enrich its own uranium," *The Washington Post,* March 19, 2018, <https://www.washingtonpost.com/business/economy/why-does-saudi-arabia-want-to-spend-billions-to-enrich-its-own-uranium/2018/03/19/1ce87608-2225-11e8-badd-7c9f29a55815_story.html?utm_term=.479b81bce193>

[189] Debalina Ghoshal, "How should the US handle Saudi Nuclear Power Aspirations," *BESA Centre,* February 7, 2019, <https://besacenter.org/perspectives-papers/saudi-nuclear-power/>

[190] Henry Foy, "Russia and Egypt to sign nuclear power plant deal," *Financial Times,* December 11, 2017, <https://www.ft.com/content/663f5dd6-af72-36b7-a002-c27ab5b13a66>

"China Egypt agree to nuclear cooperation," *World Nuclear News,* May 28, 2015, <http://world-nuclear-news.org/Articles/China,-Egypt-agree-to-nuclear-cooperation>

[191] Geert de Clercq, "Rosatom looks to nuclear newcomers to cement dominance," *Reuters,* July 11, 2018, <https://www.reuters.com/article/us-russia-nuclear-rosatom/rosatom-looks-to-nuclear-newcomers-to-cement-dominance-idUSKBN1K11OS>

[192] "Additional Protocol," *NTI,* June 13, 2012, <http://www.nti.org/media/pdfs/iaea_Additional_protocol_3.pdf?_=1340826977>

Non-nuclear weapon states under Article III of the NPT are subjected to IAEA safeguards. One of the reasons for the emergence of this protocol was Iraq and its WMD programme.[193]

One of the reasons for the Iranian nuclear impasse to become more complex was its non-adherence to the AP signed in 2003 and its refusal to ratify the same. This restricted IAEA's scope of inspecting Tehran's nuclear facilities raised further concerns that Iran's nuclear programme had PMD. Iran felt that the implementation of the AP is only valid if the nuclear deal was valid. However, with Trump pulling the US out of the deal, Iran may find it difficult to abide by the AP.

Saudi Arabia too may need to ratify the AP if it must go ahead with nuclear cooperation with the US. Hence, implementing the AP by Saudi Arabia is important if regional stability is to be maintained. Moreover, not only Saudi Arabia, but even Israel, Egypt and Qatar have also not ratified the AP.

Jordan, on the other hand, is believed to possess neither ballistic nor cruise missiles but is pursuing a civil nuclear energy programme with cooperation from Russia, Turkey, South Korea to name a few. While Jordan had ratified the AP, it only has the older version of the Small Quantities Protocol (SQP) in force. SQP is an arrangement under the Comprehensive Safeguards Agreement that allows states with minimal quantities of nuclear materials to adhere with SQP for verification mechanisms that follow norms and regulations put forward by the AP only.[194]

Comprehensive Test Ban Treaty (CTBT), 1996

The 1996 CTBT is a treaty that bans future nuclear test explosions with global monitoring systems that can detect and deter violations. No other region in the world needs the effectiveness of the CTBT than the MENA region. With the capability of producing nuclear weapons as well as nuclear delivery systems, CTBT is crucial if the MENA region wants to strengthen itself as an NWFZ. Lassina Zerbo, Secretary General of the Preparatory Commission for the CTBTO is also of the belief that a nuclear free MENA region is possible only when the region is made a test-free zone.[195] UAE Ambassador to the IAEA in 2015 Hamaad Alkabi echoed Zerbo views, "the Comprehensive Nuclear Test Ban Treaty is instrumental in achieving the goals of nuclear disarmament."[196] The country has already signed

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[193] "Additional Protocol," *NTI*, Last Update June 13, 2012, <https://media.nti.org/pdfs/iaea_Additional_protocol_3.pdf>

[194] David Santoro, "Status of Non- proliferation Treaties, Agreements and other Related Instruments in the Middle East," in eds., Harald Muller and Daniel Muller, *WMD Arms Control in the Middle East: Prospects, Obstacles Options* (USA: Ashgate Publishing, 2015), pp. 73

[195] Caline Malek, "UAE must lead by example for regional nuclear disarmament," *The National*, October 25, 2015, <https://www.thenational.ae/uae/government/uae-must-lead-by-example-for-regional-nuclear-disarmament-1.67089>

[196] Caline Malek, "UAE must lead by example for regional nuclear disarmament," *The National*, October 25, 2015, <https://www.thenational.ae/uae/government/uae-must-lead-by-example-for-regional-nuclear-disarmament-1.67089>

and ratified the CTBT and the adherence to the CTBT has been a reason why UAE has become a leader in civil nuclear infrastructure projects.

However, two countries that should seriously initiate the CTBT are Iran and Israel. *Israel* has supported a regional moratorium on nuclear tests in the region but is yet to ratify the treaty. In 2016 it had called on Iran and Egypt to sign a regional moratorium, but Israel would not progress with the treaty unless the other two key players signing it. Israel believes in a regional moratorium that could result in MENA countries successfully signing and ratifying the CTBT.[197]

Egypt supported the CTBT but criticised Israel for non-adherence but its refusal to sign the CTBT is also linked to Israel being a non-signatory to the NPT. In 2005, Egypt's Foreign Minister clarified, "Egypt's ratification of the (test ban) treaty is linked to the extent of developments that may occur in regional and international circumstances, including the possibility that Israel may join the NPT."[198] In fact, in 2010 NPT Review Conference, Cairo clarified: "We in Egypt are against even the presence of nuclear weapons in our region … but if others will acquire nuclear weapons to acquire status in the region of Middle East…we are not going to accept to be second-class citizens in the region of the Middle East."[199]

Iran is yet to ratify the treaty, and like Egypt it accuses Israel and the US of failing to ratify the CTBT. There was a belief that if the US sticks to the nuclear deal with Iran and puts faith in Iran, Tehran could ratify the CTBT. However, such an assumption was preposterous as Iran could only ratify the treaty should Israel do the same. After Washington walked out of the JCPOA, there is little scope for negotiations with Iran over the CTBT ratification.

If Egypt ratifies the CTBT and promotes the NWFZ in the Middle East, it would automatically ratify the Treaty of Pelindaba that ensures NWFZ of the African continent which it had signed but not ratified. Successful implementation of the CTBT in the MENA region is the only way to promote a NWFZ.

Saudi Arabia is another country that has not signed CTBT. This has been a concern since March 2018 when Crown Prince Mohammad Bin Salman reaffirmed the kingdom's desire to keep pace with Iran's nuclear programme and maintained, "Saudi Arabia does not want to acquire any nuclear bomb, but without a doubt, if Iran developed a nuclear bomb, we will follow suit as soon as possible."[200] Syria too has not signed the CTBT. It possesses a Chinese nuclear

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[197] Tal Shalev, "Israel urges Mideast moratorium on nuclear testing," *i24 news*, January 27, 2016, <https://www.i24news.tv/en/news/international/100752-160127-israel-urges-mideast-moratorium-on-nuclear-testing>.

[198] "Egypt sets terms for signing CTBT," *Arab News*, August 28, 2005, <http://www.arabnews.com/node/272123>

[199] Elaine M. Grossman, "Egypt Plays key non-proliferation role, but keeps nuclear options open," *NTI*, June 10, 2010, <http://www.nti.org/gsn/article/egypt-plays-key-nonproliferation-role-but-keeps-nuclear-options-open/>

[200] Steven Mufson, "Why Does Saudi Arabia Want to spend billions to enrich its own uranium," *The Washington Post*, March 19, 2018, <https://www.washingtonpost.com/business/economy/why-does-

reactor that is under the IAEA safeguards, but nuclear watchdog has little access to the reactor facility.[201] Syria's close links with North Korea is another concern for non- proliferation.

Joint Convention on the safety of spent fuel management and the safety of radioactive waste management, 1997

Nuclear reactors generate spent fuel as well as radioactive waste and both have military application thereby creating the problem of 'dual-use dilemma.' Therefore, their management is crucial to ensure nuclear safety. This convention which came into force in 1997 ensures the strengthening of nuclear safety mechanisms and the review process that allows state parties to access the best practices in nuclear safety. In the Middle East, this convention has not yet been by adopted barring UAE.

However, under JCPoA, Iran is committed to sending its spent fuel produced from its Arak heavy water reactors back to Russia. In 2016 Iran also pledged that nuclear wastes from the Bushehr Nuclear Plant would be returned to Russia.[202]

Turkey is also likely to ship its spent fuel to Russia. Presently, it has two operational reactors and its Cekmece Nuclear Research and Training Centre (CNAEM) has a waste storage facility that processes spent fuel produced by the two reactors. The facility, however, does not have a reprocessing facility.[203]

The Nuclear Fuel Cycle Commission at Joint Atomic Energy Commission (JAEC) submits policies to the government of Jordan which in return adopted a national policy for radioactive waste and spent fuel management in 2015. The plan is to conduct research and development on spent fuel management and reprocessing facilities. Under Article 26 of the Radiation Protection and Nuclear Safety and Security Law, Jordan would focus on management and treatment of spent fuel and radioactive waste. [204]

As regards to Israel's spent fuel concerns, there are assumptions that it reprocesses its spent fuel from the IRR-2 of the Negev Nuclear Research Centre to obtain plutonium for its nuclear weapons programme. This reprocessing plant is reported to be established with French assistance in the 1950s.[205] However, there are also claims that over the years, Israel reduced its

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saudi-arabia-want-to-spend-billions-to-enrich-its-own-uranium/2018/03/19/1ce87608-2225-11e8-badd-7c9f29a55815_story.html?utm_term=.c20a01732f04>

[201] "Syria," *NTI*, Updated April 2018, <https://www.nti.org/learn/countries/syria/nuclear/>

[202] "Iran to send back waste of Russian fuel to Moscow: MP", *Islamic Republic News Agency*, December 30, 2016, <http://www.irna.ir/en/News/82367457>

[203] "Turkey: Nuclear", *NTI*, Last Updated December 2011, <http://www.nti.org/learn/countries/turkey/facilities/>

[204] "Jordan," *IAEA*, Updated 2016, <https://cnpp.iaea.org/countryprofiles/Jordan/Jordan.htm>

[205] "Negev Nuclear Research Centre," *NTI*, November 11, 2011, <http://www.nti.org/learn/facilities/418/>

plutonium production for nuclear weapons and concentrated on tritium for thermonuclear weapons. Hence, it is possible that the spent fuel is reprocessed at Dimona but not used for making nuclear weapons.[206] Israel assures that it sends the spent fuel to France for reprocessing.[207] According to a 2007 report, Israel had developed a system that could safely dispose nuclear waste based on plasma gasification melting system.[208]. However, the UN chief Antonio Guterres in 2019 unveiled a report that accused Israel of burying radioactive nuclear waste in Golan Heights, a Syrian territory that is under occupation. [209]

Egypt, on the other hand, has signed a deal in 2017 to send its spent fuel to Russia for reprocessing. The need to develop warehouses of storage of spent nuclear fuel has been realised.[210] Though Egypt possesses spent fuel management and plutonium separation technologies, it has not developed reprocessing capabilities. Saudi Arabia, on the other hand, has expressed a desire to develop its enrichment technologies and technologies to reprocess fuel. Regarding waste management, the National Policy for Atomic Energy announced in 2018 would focus on the management of nuclear waste.[211]

At present, Algerian reactors are under IAEA safeguards, and hence, there is minimal scope for plutonium reprocessing process or uranium enrichment process to take place in the country.

Proliferation Security Initiative, 2002

Proliferation Security Initiative (PSI) is an arrangement that aims to prevent trafficking of WMD as well as their delivery systems and related materials to and from states and non-state actors towards strengthening non-proliferation.[212] It is seen as an important tool to break up the black markets and detect and intercept the proliferation of WMDs and related materials, and to use financial instruments to break the proliferation trade that could jeopardise regional

[206] Alexander Glaser and Marvin Miller, "Estimating Plutonium Production at Israel's Dimona Reactor," *Princeton University*, 2011, <https://www.princeton.edu/~aglaser/PU056-Glaser-Miller-2011.pdf>

[207] Avner Cohen, "The Dimona Visits (1964-1967)," *Israel and the Bomb* (USA: Columbia University Press, 1988), pp.189

[208] Ezra HaLevi, "Israel Develops System to Neutralize Nuclear Waste," *Arutz Sheva*, March 18, 2007, <http://www.israelnationalnews.com/News/News.aspx/121880>

[209] "Israel burying nuclear waste in Syria's Golan: UN," *MSN*, February 25, 2019, <https://www.msn.com/en-xl/middleeast/top-stories/israel-burying-nuclear-waste-in-syrias-golan-un/ar-BBU3jd1>

[210] "Russia to build nuclear fuel depot in Egypt," *Middle East Monitor*, December 5, 2017, <https://www.middleeastmonitor.com/20171205-russia-to-build-nuclear-fuel-depot-in-egypt/>

[211] "Saudi Arabia Approves National Policy for Atomic Energy Programme," *Asharq Al-Awsat*, March 13, 2018, <https://aawsat.com/english/home/article/1203741/saudi-arabia-approves-national-policy-atomic-energy-programme>

[212] There are one hundred and five members.

and global stability. The PSI was launched in 2002 due to the limitations of MTCR to penalise a Yemen-bound vessel—a Cambodian registered freighter with a North Korea crew—that did not use its country flag that could have make it easier to understand the country it was registered with. When Spanish crew boarded the vessel with the help US naval vessel in 2002, they discovered fifteen Scud missiles of North Korean origin along with conventional warheads. However, Cambodia, Yemen or North Korea were not members of the MTCR, and hence, the international non-proliferation regime and its regulations could not be applied to these countries and all were let free.[213]

Middle Eastern countries like Iraq, Israel, Jordan, Oman, Qatar, Saudi Arabia, UAE and Yemen are members of PSI.[214] Iran which has been accused of proliferation-related activities with state and as well as non-state actors like Hezbollah, Hamas, and Houthi rebels, is not a member of the PSI.[215] The Israeli Foreign Ministry, in collaboration with the US States organised a PSI workshop at Haifa in 2016 where scenarios focusing on nuclear, ballistic missiles and terror elements were studied.[216]

Missile Technology Control Regime (MTCR), 1987

The MTCR is an informal non-treaty association of governments which share the common interests concerning non-proliferation of missiles, unmanned air vehicles, and related technologies.[217] Except for Turkey no other Middle Eastern countries have joined the MTCR.[218] Though it had not joined the MTCR, Israel has unilaterally committed to abide by MTCR-related restrictions on missile exports. However, in 1993 there were concerns over US collaboration with Israel over the Arrow missile defence project that it defied MTCR norms. The Saudi purchase of the DF-21 missiles violated MTCR norms but neither China nor Saudi Arabia were members of MTCR at that time.

It was believed that in the 1980s, the UAE purchased Scud category missiles from North Korea and there were concerns since both the countries were not members of the MTCR. The US

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[213] "Proliferation Security Initiative," *NTI*, April 26, 2018, <http://www.nti.org/learn/treaties-and-regimes/proliferation-security-initiative-psi/>

[214] Mary Beth Nikitin, "Proliferation Security Initiative," *Congressional Research Service Report*, August 9, 2018, <https://fas.org/sgp/crs/nuke/RL34327.pdf>

[215] Ibid.,

[216] "Israel hosts bilateral Israel-US Proliferation Security Initiative workshop," *Israel Ministry of Foreign Affairs*, April 7, 2016,< http://mfa.gov.il/MFA/PressRoom/2016/Pages/Israel-hosts-bilateral-Israel-US-Proliferation-Security-Initiative-workshop-7-April-2016.aspx>.

[217] "Missile Technology Control Regime," *NTI*, January 8, 2018, <http://www.nti.org/learn/treaties-and-regimes/missile-technology-control-regime-mtcr/>

[218] The members are Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, India, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, Russia, South Africa, South Korea, Spain, Sweden, Switzerland, Ukraine, United Kingdom, United States.

opposed the sale of Black Shaheen from the UK and France to UAE because it violated the MTCR norms as the missile was of a range of 500 kilometres. UAE is a non-MTCR country, and hence, the sale was a proliferation concern.[219]

It must be noted that despite the MTCR regulations and norms, Germany, Britain and the United States—all parties to the MTCR—had in the past assisted Iraq's missile programme despite the latter not being a party to the MTCR. Moreover, in the 1990s, the British Aerospace participated in a joint venture with Egypt's Arab British Dynamics (ABD)—a company that was producing Scud-B missiles for Egypt. British Aerospace was criticised for violating the MTCR norms following which it removed its personnel working with ABD and discontinued the venture itself. [220]

The MTCR can however, take credit for the abortion of the Condor missile programme by cutting off supplies of crucial technologies to Argentina, Egypt and Iraq. However, missile cooperation continued between Egypt and North Korea—both non-parties to the MTCR—spoke more about the MTCR and that it succeeds only when states are willing as it lacks the ability to enforce its norms on them.

While the US-led invasion of Iraq led to the Libyan disarmament in 2003, the latter agreed to abide by the MTCR standards despite not being a party to the MTCR and restrict the range of its missile systems and use them only for defensive purpose highlight the extent the success of the non-proliferation regime.

At the same time, MTCR could not restrict the sale of missiles by Russia, China, and North Korea to Iran. In late 1995, Russia was caught transferring accelerometers and gyroscopes that it used for its submarine-launched missiles to Iraq via Jordan. [221] Turkey, on the other hand, is a member of the MTCR but has aspired to develop long-range ballistic missiles. One of its domestically produced missiles—Bora which has a range of 280 kilometres whose range planned to be increased as upgraded Bora-2 version—raised concerns that such a move could defy MTCR norms.[222]

The problems of MTCR and its implementation in the Middle East are not confined to states which are not parties to the control regime but also to states indulging in missile transfer to non-state actors that have jeopardised regional stability. For instance, Hezbollah is reported to

[219] "United Arab Emirates," *NTI,* October 2018, <https://www.nti.org/learn/countries/united-arab-emirates/>

[220] Deborah A. Ozga, "A Chronology of the Missile Technology Control Regime," *Non-Proliferation Review*, Winter 1994, <https://www.nonproliferation.org/wp-content/uploads/npr/ozga12.pdf>

[221] Gerald Steinberg, "The Failure of the MTCR in the Middle East," in ed., Arieh Stav, *Ballistic Missiles: The Threat and Responses,* (London: Brassey's, 1999), pp.149-170.

[222] Burak Ege Bekdil, "Turkey seeks to expand range of locally built missile," *Defense News,* May 2, 2018, <https://www.defensenews.com/land/2018/05/02/turkey-seeks-to-expand-range-of-locally-built-missile/>

have smuggled ballistic missiles into Lebanon despite repeated Israeli interdictions.[223] Missile factories that are being developed in Lebanon are a breach to MTCR norms, but Lebanon, the non-state actors or Iran supporting these developments are not parties to the MTCR. Reports claim that Hezbollah is bringing in disassembled missile components into Lebanon to avoid detection by Israel.[224] There are chances that these disassembled components are being brought from Iran.[225]

Moreover, the MTCR restricts missile transfers above the range of 300 kilometre but not below that range. Many states in the Middle East have borders which share geographical proximity and missile systems below the MTCR range of 300 kilometres can be launched against strategic targets of their adversaries. This further is a major limitation of the MTCR vis-à-vis the Middle East. The MTCR, for example, could not prevent the Scud attacks by Iraq against Israel during the Kuwait Crisis of 1990-91 thereby bringing out the loopholes of this proliferation resistant mechanism. The MTCR does not deal with the proliferation challenges regarding cruise missiles.

Hague Code of Conduct against Ballistic Missiles (HCOC), 2002

The HCOC also known as the International Code of Conduct (ICOC) is a political initiative aimed at curbing the proliferation of ballistic missiles thereby delegitimising their proliferation.[226] The code has introduced transparency measures on civilian rockets as well as ballistic missiles. The code does not call for the destruction of ballistic missiles but provides norms of trade for the same. Iran's ballistic missile programme (and of North Korea) was one of the motivations for the adoption of the HCOC. It became necessary to adopt greater transparency mechanisms to check proliferation of missiles in and from these two countries. The HCOC is a supplement to the MTCR, however, it does have limitations in terms of range or payloads.

Despite Iran being a major concern for the adoption of the HCOC, the state has not become a member of the HCOC. Israel and Syria are also not members of the HCOC despite Iran and Israel possessing missiles capable of carrying nuclear warheads. At the same time, the HCOC does not address the issue of cruise missiles, and states like Iran are developing long-range sophisticated cruise missiles as counter-measures to enemy missile defence systems, and these cruise missiles can deliver nuclear payload too. Saudi Arabia, Qatar, Yemen, UAE, Bahrain, Kuwait, and Oman have also not subscribed to the HCOC. Another issue with the HCOC is that the regime does not include hypersonic weapon systems as well as air breathing technologies, future technological proliferation concern.

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[223] "Hezbollah Believed Smuggling Powerful Missiles into Lebanon," *NTI*, January 3, 2014, <http://www.nti.org/gsn/article/hezbollah-believed-be-smuggling-powerful-missiles-lebanon/>

[224] Ibid

[225] Ibid

[226] Currently there are one hundred and thirty-nine members.

Turkey has been supportive of the HCOC though it has plans of launching national Satellite Launch Vehicle (SLV). This would be known as the Burak SLV though its payload capacity has not been disclosed. [227] Turkey that is aspiring to develop long-range missile capability can also use SLV technology to develop IRBM and ICBM capability.

It must be interesting to understand that the HCOC deals with SLVs since SLVs can be converted into ballistic missiles. In 1989, when Iraq launched the Al-'Abid SLV, there was concern that it was acquiring long-range strike capability. When Iran claimed it has developed Safir, it drew criticisms since this SLV could be used to develop long-range missile systems. There are concerns that SLVs can make it easier for Iran to develop ICBM capability as both systems have similar technologies. Shavit SLV of Israel was reportedly the basis for the nuclear-capable long-range Jericho-3 missile.[228]

Countries like Egypt, Algeria and South Sudan are yet to sign the HCOC. Algeria and Egypt have argued against the HCOC because the limited scope of the code did not leave any ground to address the states' efforts to modernise ballistic missiles and have also raised the issue of development of cruise missiles which the HCOC failed to address.[229]

International Convention for the Suppression of Acts of Nuclear Terrorism, 2005

This convention was entered into force in 2005 and criminalises acts of nuclear terrorism along with requiring the signatories to prosecute terrorist suspects in domestic courts or extradite them to their home countries. The Convention urges states to ensure the protection of radioactive materials. The MENA region is viewed to be susceptible to nuclear terrorism. In 2016, there were reports that ISIS could use ‘dirty bombs' against European cities and that the group had used chemical weapons in Syria.[230] In 2016, Secretary-General of Hezbollah Hassan Nasrallah declared that “Lebanon has a nuclear bomb.” He further stated, “We do not want

[227] Bilal Khan, “Turkey Reportedly Laying Basis for Satellite Launch Vehicle Programme,” *Quwa,* December 4, 2017,< https://quwa.org/2017/12/04/turkey-reportedly-laying-basis-for-satellite-launch-vehicle-programme/>

[228] Alon Ben-David, “Israel tests enhanced ballistic missile,” *Aviation Week,* July 29, 2013, <https://aviationweek.com/awin/israel-tests-enhanced-ballistic-missile>

[229] Nicholas Kasprzyk, Emmanuelle Maitre, Xavier Pasco and Noell Stott, “The Hague of Conduct against Ballistic Missile Proliferation: Relevance to African States,” *Institute for Security Studies,* Policy Brief 90, September 2016, <https://www.frstrategie.org/web/documents/publications/autres/2016/2016-maitre-iss-hcoc.pdf>

[230] Vincent Wood, “ISIS is plotting a DIRTY BOMB strike on a major EUROPEAN city, top nuclear experts warn,” *Express,* June 10, 2016, <https://www.express.co.uk/news/world/678583/ISIS-dirty-bomb-nuclear-strike-europe-Moshe-Kantor-terrorism-nuke>

war. This kind of war is not a part of our strategy, but we must be ready for it, in order to prevent it and in order to be able to win it, if it takes place."[231]

However, Iran which is suspected of providing weapon systems to Hezbollah and Hamas is not a party to the Convention. Presently, Algeria, Iraq, Lebanon, Libya, Yemen are signatories to the treaty. Saudi Arabia is not a signatory to the convention but in 2016 it donated US$10million to establish a specialised centre to combat nuclear terrorism at the IAEA headquarters. In 2014 also the Kingdom provided a donation for combating nuclear terrorism.[232]

In 2012 Turkish Foreign Ministry maintained: "As a country on the brink of its nuclear power programme, Turkey has made strides in recent years in updating its legislative framework in order to ensure compatibility with the highest international standards in the nuclear field and in enhancing its capacity of implementation." The Ministry further acknowledged the ICSANT as "one of the main international legal instruments for ensuring peaceful use of nuclear energy in the best, safety, security and non-proliferation concerns."[233]

There are states on the other hand, which acceded to the arrangement despite opposition from their lawmakers; Yemen where parliamentarians raised issues over Israel and the US is a party to the ICSANT. Egypt did not ratify the Convention probably because Israel has not done. Both have however, signed the Convention in 2005 and 2006 respectively. Syria too has signed the Convention in 2005 but has not yet ratified the Convention. Sudan, on the other hand, has not even signed the Convention and instead decided to go ahead with nuclear power programme in collaboration with Russia.[234] With no adherence to nuclear power safety and nuclear terrorism control mechanisms, there has been concern over Sudan's nuclear programme.[235]

Global Initiative to Combat Nuclear Terrorism (GICNT), 2006

The GICNT was initiated by the United States and Russia and created during the G8 Summit in 2006 to prevent, detect, and respond nuclear terrorism through multilateral activities. Countries like Bahrain, Iraq, Israel, Jordan, Libya, Saudi Arabia and Turkey are participants to

[231] Neri Zilber, "Hezbollah Claims a 'Nuclear Option' in tense standoff in Israel," *Daily Beast*, March 3, 2016, <https://www.thedailybeast.com/hezbollah-claims-a-nuclear-option-in-tense-standoff-with-israel>

[232] "Saudi Arabia donates $10million to fight nuclear terrorism," *The Embassy of the Kingdom of Saudi Arabia*, April 2, 2016, <https://www.saudiembassy.net/news/saudi-arabia-donates-10-million-fight-nuclear-terrorism>

[233] "Turkey part of nuclear terrorism convention," *Hurriyet Daily News*, September 9, 2012, <http://www.hurriyetdailynews.com/turkey-part-of-nuclear-terrorism-convention-30966>

[234] "Sudan, Russia to sign accord to develop nuclear power: SUNA agency," *Reuters*, March 13, 2018, <https://af.reuters.com/article/topNews/idAFKCN1GP0ME-OZATP>

[235] Ibid

the GICNT. [236] However, countries like Algeria, Syria and Egypt are not participants to the GICNT.[237]

Fissile Material Cut off Treaty (FMCT)

The FMCT is still at its nascent stage and yet to enter into force and is delayed due to objections from several countries regarding the prospects and future of FMCT. Initiated in 1995 it aims to cut off the future uranium and plutonium production to prevent further development of nuclear weapons. However, the FMCT has not been able to attract many states and in the Middle East, Israel has strongly opposed the Treaty. According to it, signing the FMCT would undermine its 'nuclear opacity,' and the FMCT would not be a regional safeguard against nuclear proliferation. [238] Israel believes that in the regional context, nuclear disarmament can only be possible if regional peace is ensured while at the global level Israel believes that the FMCT would fail to deal with the challenges of nuclear fuel cycle capabilities.

On the other hand, countries like Egypt, Iran, and Algeria stand by the proposal of Pakistan for a Fissile Material Treaty that would consider even existing fissile material stockpile. Turkey supports the FMCT and calls for a moratorium on production of fissile materials in the absence of negotiations on a legally binding treaty. It also believes that the impasse around the Treaty would also need to be broken for the success of the Treaty.[239]

Proposed Prevention of Arms Race in Outer Space (PAROS)

To ensure the prevention of arms race in outer space China and Russia have taken the initiative to take PAROS forward. Both have linked the success of PAROS to the success of FMCT and have argued that only when the US takes PAROS seriously would China and Russia take FMCT seriously.[240] The US, on the other hand, believe that there are no arms race in the outer space.

Some of the Middle Eastern countries like Iran has expressed support for maintaining outer space for peaceful purpose. Iran has been in support of the PAROS and has warned against the adverse effects of militarisation and weaponisation of space. Turkey too has been supportive of the PAROS as well as the FMCT. [241] Israel, along with the US, does not support the PAROS

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[236] "Global Initiative to Combat Terrorism," *NTI*, Last Updated September 30, 2018, <https://www.nti.org/learn/treaties-and-regimes/global-initiative-combat-nuclear-terrorism-gicnt/>

[237] Ibid

[238] "Nuclear Disarmament: Israel," *NTI*, July 14, 2017, <http://www.nti.org/analysis/articles/israel-nuclear-disarmament/>

[239] "Russia, India, Algeria, Poland, Turkey address disarmament conference on nuclear, other issues," *United Nations*, June 2, 2005, <https://www.un.org/press/en/2005/dcf448.doc.htm>

[240] Daryl Kimball, "Fissile Material Cut-off Treaty (FMCT) at a glance," *Arms Control Association*, June 2018, <https://www.armscontrol.org/factsheets/fmct>

[241] "Arms control and disarmament," *Ministry of Foreign Affairs, Republic of Turkey*, <http://www.mfa.gov.tr/arms-control-and-disarmament.en.mfa>

and has voted against the PAROS. But Israel's refusal has not deterred Egypt and Algeria from supporting the PAROS and both have voted for the resolution in addition to countries like Oman, Lebanon, Saudi Arabia and Yemen.

UNSC Resolution 1540, 2004

Through resolution 1540 adopted on 18 April 2004, , the UN Security Council decided that all states shall refrain from providing any form of support to non-State actors that attempt to develop, acquire, manufacture, possess, transport, transfer or use nuclear, chemical or biological weapons and their means of delivery, in particular for terrorism [242] The resolution requires all states to adopt and enforce appropriate laws to this effect and other effective measures to prevent the proliferation of these weapons and their means of delivery to non-state actors, in particular for terrorist purposes.

Turkey has been supportive of this resolution. During the phase of implementation, Algeria reported maximum measures taken under the resolution to fight proliferation. Iran and Iraq reported implemented only three measures stated in the Resolution while Egypt, Jordan, Libya, and Qatar only reported to implement only one measure. Yemen and Bahrain had an unsatisfactory report on their adherence to the provisions laid down by the Resolution and so was the case with Israel. [243] Iran's record of the proliferation of missile systems to Hamas and Hezbollah implies that it had failed to comply with the Resolution.

Missile Defence System

While diplomatic efforts like international treaties, regimes, and conventions exist to prevent proliferation of missiles and nuclear and unconventional warheads, states have argued over the loopholes of these arrangements. International and regional security cannot, therefore, be met only on the goodwill of the states to abide by these treaties and regimes. Moreover, non-state actors are not parties to such treaties and regimes, and hence, they cannot be penalised for violating these legal proliferation resistant arrangements.

Thus, not only should states rely on the goodwill and diplomatic gestures like treaties, conventions and regimes but they must also increase their strategy of 'defence by denial' by strengthening deterrence through a missile defence system. When adversaries realise that the deterrent value of their missiles even if armed with nuclear or unconventional warheads is reduced due to the existence of missile defence system that can intercept the incoming missiles, there would be lesser zeal to use them. The missile defence systems are not entirely technology denial systems, as states can also develop countermeasures against this missile defence system. But they affect the psyche of the adversary.

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[242] "UN Security Council Resolution 1540 (2004)," *UNODA*, <https://www.un.org/disarmament/wmd/sc1540/>

[243] Lars Olberg, "The Implementation of the Resolution 1540 in the Middle East," *Sandia National Laboratories*, February 2008, <http://www.sandia.gov/cooperative-monitoring-center/_assets/documents/sand2007-7938.pdf>

The MENA region has expressed interest to possess the most sophisticated missile defence systems and to an extent have also acquired the same. The GCC countries not only faces missile threats from Iran but also from Yemen. The GCC has urged to develop an integrated missile defence system for greater and effective defence against incoming ballistic missile threats. Saudi Arabia has expressed interest in the S-400 missile system.[244] Russia will likely supply S-400s to Qatar despite Saudi Arabia's opposition due to the ongoing Qatar crisis...[245] Saudi Arabia also operates the Patriot systems to intercept incoming missiles being fired by Houthi rebels in Yemen that have sometimes met with successes while at times failed to intercept.[246]

Other MENA countries are also seeking ways to strengthen their missile defence capability. Russia's new S-400 anti-missile defence system has found a new market in the Middle East. Egypt acquired the Russian S-300VM Antey-2500 missile defence system in 2017 for long-range protection against both aircraft and missiles.[247]

Turkey has expressed interest in S-400s for its missile defence system, but NATO would not allow a member country to make the S-400s interoperable with its missile defence system in the Middle East. In January 2018, Turkey awarded a joint contract to Turkey's Aselsan and Roketsan as well as to Franco-Italian EUROSAM consortium for the study and development of long-range air and missile defence system to.[248] The project is expected to become a component of Turkey's indigenous air and missile defence project. Turkey also operates the Patriot missiles in its territory to protect from missile attacks from Syria.[249] There are reports

[244] "Russia in Talks over S-400 air defence systems with Qatar, Saudi Arabia," *Daily Sabah,* February 19, 2019, <https://www.dailysabah.com/defense/2019/02/19/russia-in-talks-over-s-400-air-defense-systems-with-qatar-saudi-arabia>

[245] "Qatar FM: Doha buying S-400s 'not anyone's' business," *Al Jazeera,* March 4, 2019, <https://www.aljazeera.com/news/2019/03/qatar-fm-doha-buying-400s-business-190304094712372.html>

[246] Daniel Brown, "This is the Patriot system that just 'failed catastrophically' in Saudi Arabia," *Business Insider,* March 28, 2018, <https://www.businessinsider.in/This-is-the-Patriot-missile-defense-system-that-just-failed-catastrophically-in-Saudi-Arabia/articleshow/63522681.cms >

[247] Bilal Khan, "Egypt takes delivery of the Almaz-Antey S-300VM SAM System," *Quwa,* June 8, 2017, <https://quwa.org/2017/06/08/egypt-takes-delivery-almaz-antey-s-300vm-sam-system/>

[248] Vivienne Machi, "Turkey expected to invest in a wide range of new weaponry," *National Defense,* June 12, 2018, http://www.nationaldefensemagazine.org/articles/2018/6/12/opportunities-abound-in-turkish-weapons-market-over-next-decade

[249] Yesim Dikmen, "First Patriot missiles to defend Turkey against Syria go active," *Reuters,* January 26, 2013, <https://www.reuters.com/article/us-syria-crisis-patriot/first-patriot-missiles-to-defend-turkey-against-syria-go-active-idUSBRE90P0CC20130126>

that the US hopes that Turkey may also buy the Patriot from the US if it cancels the S-400 deal with Russia.[250]

According to reports, Russia has deployed S-400 missile defence system in Syria. Syria also possesses the Russian S-200s and Buk air and missile defence system, though Russia did not provide the S-300s to Syria following opposition from the EU. [251]

Israel on the other hand, has developed three-tier missile defence system that make up its layered missile defence. This comprise of Iron Dome, Arrow interceptors and David Sling.[252]

[250] "WE need Turkey to buy the Patriot: Pentagon chief," *Hurriyet Daily News,* March 28, 2019, <http://www.hurriyetdailynews.com/we-need-turkey-to-buy-the-patriot-pentagon-chief-142233>

[251] Peter Beaumont and Andrew Roth, "Russia claims Syria air-defences shot down 71 of 103 missiles," *The Guardian,* April 14, 2018, <https://www.theguardian.com/world/2018/apr/14/russia-claims-syria-air-defences-shot-down-majority-missiles>

[252] "Fact Sheets: Israel's Missile Defense Systems," *Jewish Virtual Library,* <https://www.jewishvirtuallibrary.org/israel-missile-defense-systems>

4. Implications for India

Missile developments in one region will always have in a domino effect not only in that region, but also to nearby regions too. The concept of security dilemma that leads one state to develop missile systems when it feels threatened by the military developments of its adversary often leads to an arms race not only between the states of that region but can result in an arms race in another region.

Missile developments in the MENA region do not directly affect strategic stability for India nor does the latter share hostile relations with countries in the MENA region to develop missiles capable of reaching these countries. The dilemma dyad existing between US-China, on the other hand, impacts India more.

However, some of the states in the Middle East, for instance, Israel and Pakistan--another nuclear armed state in South Asia—do not share cordial relations with each other- another nuclear-armed state in South Asia. Any missile development in Israel is likely to raise concerns for Pakistan too, and the latter could work towards better capability to deter Israel, a move that in turn can cause concern to India.

The Middle East is experiencing ballistic and cruise missile developments to which Pakistan cannot remain complacent. In addition, Israel is not a declared nuclear weapons power. Iran's nuclear-capable missiles are also a worrying factor for Pakistan as it shares a border with Iran. Amid these concerns, it is interesting to draw how the arms race in the MENA region would affect strategic stability in South Asia. It is also worth noting that as a part of its Belt Road Initiative (BRI), China is engaged in military and defence cooperation with Middle Eastern countries which would join the BRI. This cooperation extends to missile and missile defence cooperation too.

Russia is increasing its foothold in the region by providing sophisticated missile defence systems and short-range tactical ballistic missiles to some of these countries, thereby increasing the missile and missile defence arms race. In addition, the US is providing missile defence systems to some these countries as well as collaborated with Israel in missile defence programme.

It is in this context that the section analyses how these factors will have implications for India though not directly but indirectly.

Pakistan's Middle East concern

Pakistan's nuclear and missile programme operates as a chain reaction also due to developments in the Middle East. Its arch rival in the Middle East—Israel supports and sympathises with India on the issue of Kashmir and top Israeli officials have confirmed that under no circumstance would Israel support Pakistan on the issue of Kashmir.[253]

[253] Sachin Parashar, "Israel says will never support Pakistan on Kashmir," *The Times of India*, August 19, 2017, <https://timesofindia.indiatimes.com/india/israel-says-will-never-support-pakistan-on-kashmir/articleshow/60135571.cms>

Israel's nuclear capacity is a concern to Pakistan and vice-versa. What concerns Pakistan more is any effort by Israel to destroy Pakistan's nuclear capability by attacking its nuclear facilities as happed to Iraq and Syria. Pakistan's 2,750-kilometre range Shaheen III category missiles can not only target India's Andaman and Nicobar Islands but also Israel. On the other hand, some reports have stated that nuclear capability of Pakistan and not Iran that is a threat to Israel.[254] The long-range Jericho 3 missiles may be capable of targeting Pakistan as such missiles are being developed to target Iran. In 2016, Pakistan's Defence Minister responded to a fake threat from his Israeli counterpart that Pakistan would face nuclear attack if it sent ground troops to Syria by warning, "Pakistan is a nuclear state too."[255]

In addition, Pakistan may be forced to live with another nuclear neighbour, Iran. Just like India, Iran too is a victim of proxy wars waged by Pakistan and in 2017 Tehran has threatened to attack bases in Pakistan that promote proxy wars.[256] Besides, Pakistan's proximity to Saudi Arabia, an arch rival of Iran especially in the Yemen crisis, is also a concern for Tehran as it views this as an anti-Iran coalition. As Pakistan sides with Saudi Arabia in the Yemen crisis[257], the Houthi rebels with longer-range missiles could strike at Pakistan just like they did vis-à-vis Saudi Arabia and UAE.

Moreover, Pakistan would need to live with the growing tensions between Iran and Saudi Arabia. Pakistan shares powerful ties with Saudi Arabia and had nuclear cooperation with Iran in the past, credited to A.Q. Khan Network.[258] Pakistan has supported Iran's right to pursue a peaceful nuclear programme as the latter is a signatory to the NPT. Saudi Arabia, on the other hand, does not support JCPoA and has supported Trump's calling off the nuclear deal. The disturbing relations between Iran and Saudi Arabia would need Pakistan to balance its relations diplomatically and evolve a robust military capability including nuclear capability to be able to follow an independent foreign policy towards both the countries, especially as Iran can also become a nuclear threat for Pakistan should it wish to pursue the bomb.

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[254] Azriel Bermant, "Pakistan is the only Muslim Nuclear State- So Why is Israel's Hysteria Reserved for Iran?", *Haaretz*, May 20, 2015, <https://www.haaretz.com/opinion/.premium-why-isn-t-israel-hysterical-over-pakistan-s-nuclear-bomb-1.5364286>

[255] Shimon Arad, "How Israel and Pakistan can avoid a nuclear shadow," *National Interest*, February 19, 2018, <https://nationalinterest.org/feature/how-israel-pakistan-can-avoid-nuclear-showdown-24554>

[256] Dipanjan Roy Chaudhury, "Iran President warns Pakistan over inaction against state-sponsored terrorism," *Economic Times*, March 11, 2019, <https://economictimes.indiatimes.com/news/defence/iran-president-warns-pakistan-over-inaction-against-state-sponsored-terror/articleshow/68348734.cms?from=mdr>

[257] Dr. Shaul Shay, "Pakistan Increases Military Support to Saudi Arabia," *Israel Defense*, March 25, 2018, <https://www.israeldefense.co.il/en/node/33567>

[258] Catherine Collins and Douglas Frantz, "The Long Shadow of A. Q. Khan," *Foreign Affairs*, January 31, 2018, <https://www.foreignaffairs.com/articles/north-korea/2018-01-31/long-shadow-aq-khan>

Pakistan probably draws lessons from Afghanistan and Iraq. The US invaded Afghanistan in 2001 due to the country becoming a safe haven for al-Qaeda and Iraq as it was believed to be possessing WMDs. Pakistan is a safe haven for terrorists, and it possesses nuclear weapons. Thus, Pakistan's nuclear capability had to be credible enough to even deter any Iraq-type moves by the US against it.

Pakistan would not have followed the Libyan footsteps and given up WMD and missile programme especially when it is threatened by India's growing capabilities. Its missile capability and nuclear weapons also ensured that it is not coerced like Libya to give them up. Pakistan is aware of the sophisticated missile defence system that Israel is reported to possess and hence would need to make its missile systems credible enough by ensuring that the missile systems are equipped with countermeasures to evade Israeli missile defence systems.

These developments are serious raising concern for India. In addition, India and Pakistan have implemented a self-imposed moratorium on nuclear testing though both have not signed CTBT. If Israel does not ratify the CTBT, there is a lesser chance for Pakistan to sign the CTBT even if India does, more so as Israel does not even have a voluntary moratorium.

Similarly, Israel has strongly opposed the FMCT because such a treaty would mean Israel has to give up its nuclear opacity, Pakistan has also opposed it on grounds that the treaty did not include existing fissile material. If Israel does not adhere to the FMCT, Pakistan would find it difficult to sign it and this would have a domino effect on India leading to New Delhi shying away from it. The success of the FMCT in South Asia depends on its successful implementation in the Middle East. If countries like Israel and Iran do not cooperate on the Treaty, Pakistan would find it difficult to discuss any progress on the treaty, even if India does so.

These factors have led Pakistan to continue with its nuclear weapons programme as well as improvising its delivery systems making them reliable and credible. India cannot overlook or ignore these developments. Moreover, during the Kargil conflict, both were on the brink of a nuclear war. Since then both the nuclear powers have worked towards making their nuclear forces and arsenal credible and modernised. To balance the stability-instability paradox, if India develops a weapon system, Pakistan would do so follow suit to maintain parity.

While Pakistan is reported to be working towards MIRV capability on their Ababeel missile, reports claim that India's Defence Research and Development Organisation (DRDO) is also working towards the same.[259] Both countries have matched capabilities regarding sophistication in ballistic and cruise missiles. Pakistan has also developed TNWs while India has refrained from doing so.

India's nuclear doctrine is premised on the belief of a 'no-first-use' doctrine coupled with a posture of 'credible minimum deterrence.' TNWs do not fit the doctrine and posture at least the moment.

China's Belt Road Initiative (BRI)

[259] V.K. Bhatia, "India Developing MIRVs," *SP's Magazine,* Issue 10, 2009, <http://www.sps-aviation.com/story/?id=370>

China's BRI that would make the Middle East an integral part comprises of sales of weapon systems to some of these states and these include missile sales to countries like Qatar. China is also accused of aiding Iran's missile programme. In 2016, China supplied Saudi Arabia with drones, some of them possessing missile firing capabilities. In the recent past, before it chooses the Russian S-400s as an anti-missile system, Turkey's choice was the Chinese FD-2000. Ankara went for the Russian system only after problems with the Chinese system.

These initiatives can increase regional tensions by flaring up arms race which in turn can drive Pakistan directly into an arms race. This could become a burden on Islamabad's defence budget and leading to a financial menace. Pakistan can indulge in both horizontal and vertical proliferation. Horizontal proliferation relates to the proliferation of weapon systems from one state to another while vertical proliferation refers to the modernisation of weapon systems to make them more reliable and credible. Such proliferation trends can result in India being involved in vertical proliferation. India is already reported to be working on hypersonic cruise missiles after a successful stint with its BrahMos supersonic cruise missiles.

Missile and missile defence sales by Russia and the US

Russia has been playing a crucial role in the Middle East as weapons supplier and is providing sophisticated weapon systems to some of the US allies. Turkey and Saudi Arabia have expressed interest in the Russian missile defence system that is reported to be one of the most advanced weapon systems in the world. In the past, Moscow has also provided S-300s to Iran, Egypt and Syria.

On the other hand, the US is competing the Middle Eastern market with its Patriot systems and the more advanced systems like the Terminal High Altitude Area Defence Systems (THAAD) as well the Aegis systems. These made nuclear deterrence complicated and sophisticated than ever before. Naturally, with geographic proximity, Pakistan would want to maintain a reliable nuclear deterrence that can strengthen its 'full spectrum deterrence' capability not just against India but also deter the Middle East. India will not be able to slow down on its nuclear modernisation process.

India's other complexities

While Iran's missiles do not pose any direct threat to India, Tehran's links with countries like China and Pakistan on missile and nuclear programme is an aggravating factor for India and its efforts to promote non-proliferation in the region. China plays a crucial role in Iran's economy and Iran is an integral part of China's BRI in which defence cooperation is a vital component. This could mean that China could influence many decisions in Iran should it feel necessary. Iran has offered China and Pakistan participation in the Chabahar project together with the Indian participation. Iran has also offered to participate in the China Pakistan Economic Corridor (CPEC), a Chinese initiative objected by India.[260]

[260] "Iran invites Pak and China to join Chabahar project with India: Reports," *Business Standard*, March 13, 2018, <https://www.business-standard.com/article/current-affairs/iran-invites-pak-and-china-to-join-chabahar-project-with-india-reports-118031300606_1.html>

In 2013, there were reports that China was ready to offer its nuclear umbrella to Ukraine[261] and it might make similar offers to other states in the Middle East. Should Iran go nuclear, Saudi Arabia, Israel, and Turkey would follow suit. There are indications that smaller countries like Jordan, UAE or and Qatar are wanting to become nuclear powers should the region become nuclearized. China may seek to intervene and offer a nuclear umbrella to these smaller states to prevent them from becoming an indigenous nuclear power. Such a move could exert China's influence in the Middle East, and India could lose out on strong bilateral relations with these countries.

Should Iran and North Korea continue to cooperate on nuclear and ballistic missile issues, this could lead to regional tensions in North East Asia. Japan and South Korea would be apprehensive of such cooperation and resort to strengthening their defence capabilities leading to China becoming more concerned about its nuclear deterrence vis-à-vis Japan and South Korea. This could lead to China further modernising its nuclear capability, thereby resulting in India to follow suit.

Along with these concerns, in 2011 Iran claimed that its missile could reach targets in the Indian Ocean. This move was probably a deterrent against the US that threatened military strikes against Iran.[262] India has recently joined the Quadrilateral Security Dialogue (QUAD) that comprise the US, Australia, and Japan. The QUAD is seen as a counter against China's growing rise in the Indian Ocean. However, Iran's missiles are within the reach of the Indian Ocean and in future should a crisis arise between Iran and the US, Tehran could be tempted to fire missiles against QUAD forces.

A positive implication for India, however, is that the drive to acquire sophisticated missile systems by Middle East countries can prove economically beneficial to India. India's BrahMos supersonic cruise missile is ready for sale as India has already developed the export version of the missile

. Countries like Saudi Arabia, Qatar, Oman, and UAE are on a high priority list for India. China is already taking advantage of the Qatar crisis and selling missile systems to Qatar. India could venture into these markets.

However, selling BrahMos to countries like Saudi Arabia that is a close ally of Pakistan wold mean that the latter could acquire information on the missile technology and develop counter-countermeasures to intercept the missile system. Nevertheless, India's short-range solid fuelled

[261] Miles Yu, "Inside China: Ukraine gets nuclear umbrella," *The Washington Times,* December 12, 2013, <https://www.washingtontimes.com/news/2013/dec/12/inside-china-ukraine-gets-nuke-umbrella/>

[262] "Iran says its missiles have reached Indian Ocean for the first times," *Haaretz,* July 9, 2011, <https://www.haaretz.com/1.5025853>

surface-to-surface ballistic missile Prahaar has been offered for export and countries like Turkey and Egypt could be potential customers.[263]

Again, as regards sanctions on Iran, India is least likely to support the sanctions after US President Trump's rejection of the nuclear deal. Minister of External Affairs, Sushma Swaraj has stated that India would only support UN imposed sanctions and not any country-imposed sanctions.[264]

Turkey and Pakistan have cooperated on defence issues in the past and are cooperating. Turkey could provide sophisticated stand-off cruise missiles to Pakistan. Ankara has already developed Sensitive Guided Stand-off Cruise Missile that can hit targets behind enemy lines without having to be susceptible to enemy defence systems. Though Pakistan already possesses air-launched cruise missile like the Ra'ad that is even nuclear capable, another sophisticated weapon system would only strengthen its air power prowess.

[263] Rahul Singh, "India eyes it big as a major exporter of military hardware," *Hindustan Times,* February 21, 2017, <https://www.hindustantimes.com/india-news/indian-missile-firm-looking-to-export-weapons-to-turkey-egypt/story-onVBOMkg848DTeHmpRWotJ.html>

[264] Dipanjan Roy Chaudhury, "India to continue oil trade with Iran: Sushma Swaraj," *The Economic Times,* March 29, 2018, <https://economictimes.indiatimes.com/news/politics-and-nation/india-says-it-only-follows-un-sanctions-not-unilateral-us-sanctions-on-iran/articleshow/64354817.cms>

5. Conclusion

The missile development spree in the MENA region is not just a result of threat perception, but also due to a desire to showcase technological prowess and military strength. Many MENA countries have realised that missiles, especially ballistic missiles, are psychological weapons that enhance the state's reputation in the international order, provide the power to compel other states into negotiations and last but not the least, provide the military strength to be able to exert its influence in the region and beyond.

The developments are not just confined to Scuds and states have become more ambitious in their zeal to pursue missile development programmes. These include modifications in missile systems, use of guidance systems for improved accuracy, development of counter-measures to evade missile defence system and pursuing SLV programme that in future could be used to develop ICBM technology. These developments highlight that it not just threat perception but also the desire to exert influence that pushes these states to develop such systems. The domino effect in this region is not just driven by threat perception but also by technological competitiveness.

One of the reasons why some of the states have been able to pursue missile technology development is because some of the states are rich source of oil reserve. The hard cash earned from oil exports has been used for the development of the missile programme and these are also accompanied by several complications in the region.

Some of the states in the region support the non-state actors like Hezbollah and Hamas and have provided them with missile systems. These non-state actors have also received aid from North Korea. This has led to proliferation concerns in the region and transformed it into one of the most dangerous zones of missile proliferation.

Several technology control regimes do exist but adherence to these regimes is poor. States do not trust these regimes and some view that their adherence to the regimes is only possible when their rivals join the same. Such security dilemma makes the implementation of the non-proliferation regimes more difficult.

These developments indirectly affect India. Globalisation meant that states in a region may not remain unaffected by the developments that take place in another region. Security dilemma is no more confined to the regional periphery but has extended their borders too. Missile developments and nuclear programme in the Middle East does affect security prospects in India also as they directly affect the security of Pakistan.

Only when states accede to these treaties and international norms can Middle East achieve an NWFZ. Until then achieving a nuclear free Middle East would only remain an elusive dream.

About the Author

Debalina Ghoshal is a Non-Resident Fellow with The Council on International Policy based in Canada. She specialises in missile and missile defence, artillery and nuclear issues and has written more than one hundred articles and papers for both national and international journals, magazines and newspapers. She was previously associated with the New Delhi-based Centre for Air Power Studies and Delhi Policy Group.

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