China and the Middle East

The Quest for Influence

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*Chinese Arms Exports to Iran**

Bates Gill

Since the mid-eighties, Chinese arms exports to Iran have raised concern within the international community.[1] More recently, in conjunction with the US–China summit of October 1997, China apparently took a number of steps to curtail sensitive transfers to Iran as part of a broader, more positive trend in Chinese non-proliferation policy. While it appears that Chinese arms exports to Iran may diminish, numerous concerns nevertheless persist that China continues to provide Iran with systems and technologies which contribute to the further development of its cruise and ballistic missile capability, as well as to its alleged nuclear, chemical and biological weapons related programmes.

Greater attention should be brought to bear on these concerns for several reasons. First, the Iranian development and possible deployment weapons of mass destruction run counter to international agreements and multilateral arrangements such as the Nuclear Non-proliferation Treaty (NPT), the Chemical Weapons Convention (CWC), and the Missile Technology Control Regime (MTCR).[2] Second, an increasing military capability for Iran, based in part on its cooperation with China, may escalate regional tensions as Iran presents a robust military capability in the Persian Gulf and beyond. Third, China's arms trade relationship with Iran has posed serious obstacles to the improvement of an important global relationship—Sino–US ties. Fourth, at the level of Chinese national policy, there remain a number of questions as

* Portions of this article appeared in *Silkworms and Summitry: Chinese Arms Exports to Iran and US–China Relations* (Washington, DC: Asia–Pacific Rim Institute, December 1997).

[1] Throughout this paper, the terms 'arms' and 'weapons' will be broadly defined to include major conventional weapons, nuclear, chemical and biological weapons, missiles, as well as technologies and assistance related to these systems. However, the focus of this paper will be on Chinese transfers to Iran of systems and technologies related to weapons of mass destruction and missiles.

[2] Iran is a party and member in good standing to both of these treaties. According to the provisions of the CWC, Iran's October 1997 ratification of the CWC means that it must within thirty days submit a declaration to the Convention's governing body to 'declare whether it owns or possesses any chemical weapons, or whether there are any chemical weapons located in any place under its jurisdiction or control'. China is not a member of the MTCR. Through bilateral commitments with the United States in 1992 and 1994, it has agreed to abide by the original guidelines and control list of the MTCR, but not to subsequent revisions to the regime. The regime regulates the export of missiles and unmanned vehicles capable of delivering a 500 kg payload at least 300 km, and their related technologies.

to whether the country has both the will and the ability to implement, monitor and enforce its non-proliferation commitments.

In order to assess the current and likely future scope and nature of Sino–Iran arms trade, and how it affects these larger international and regional security concerns, several important questions should be addressed.

1. What are the broader strategic, political, and economic motivations which drive Chinese arms trade with Iran? Have these factors changed over time in a way conducive to diminished Sino–Iranian arms trade in the future?
2. What has been the extent and nature of Chinese arms trade with Iran? Has China taken meaningful steps to curtail its arms trade with Iran?
3. Has the nature of this trade changed significantly over time? In what ways has this trade changed to make it more or less problematic for international and regional security concerns?

In the following, these and related questions will be addressed by reviewing the background and strategic rationale for Chinese arms exports to Iran, detailing the extent and nature of that trade, and assessing the encouraging developments and continuing concerns related to the Sino–Iranian arms trade relationship. While China has taken a number of positive steps in recent years to curtail its export of sensitive weapons and technologies to Iran, more needs to be done to reduce continued exports to Iran and ensure that China can fulfil the non-proliferation goals it has set for itself.

BACKGROUND TO SINO–IRANIAN ARMS TRADE

With the collapse of the Sino–Soviet relationship in the early sixties and with the increasing US presence on China's border in Southeast Asia, China stepped up its diplomatic efforts to establish friendly relationships with the developing world. The 1965 visit of Zhou Enlai to Tehran broke new ground in this regard, and by the end of the decade the Shah of Iran was on record in support of opening the United Nations membership to the PRC. In early 1970 Iran abstained from voting on the resolution to admit the PRC to the United Nations—the first time it had not voted against admitting the PRC—and in August of that year the two countries established formal diplomatic relations. In severing official ties with Taiwan, Iran recognised the PRC as 'the sole legal Government of China' and for its part, China promised to support 'the Imperial Government of Iran in its just struggle to safeguard national independence and state sovereignty and protect its national resources'.[3]

Beijing increasingly saw Iran as a bulwark against perceived Soviet expansionist aims toward the Persian Gulf, and favourably viewed the Shah's efforts to become, with US assistance, the most powerful military force in Southwest Asia. Interestingly, the

[3] 'Joint Communique on Establishment of Diplomatic Relations Between China and Iran', *Peking Review*, 20 August 1971, p. 4.

Shah's dependence on US military assistance was not criticised, but supported: 'the Shah is concerned about growing Soviet influence in the Middle East and is anxious to improve Iran's military forces'.[4] Sino–Iranian relations continued to be strong even into late 1978 as the Shah's regime began its final decline. China expressed concern in its public diplomacy with Soviet efforts to take advantage of the deteriorating situation in Iran. In September 1978, Mao's hand-picked successor, Hua Guofeng, led a high ranking delegation to Tehran. Hua's visit—coming just four months before the final departure of the Shah from Iran—was the last by a head of state to Tehran before the collapse of the Shah's rule.

It took some time for diplomatic ties between China and Iran to develop following the establishment of the Islamic Republic in March 1979. China had just launched its punitive war against Vietnam and focused its attention on expanding Soviet influence in Southeast Asia. The new Iranian leadership was suspicious of countries such as China which had close ties with the Shah. However, owing to China's abiding concerns about Soviet influence in Southwest Asia, China took steps to re-establish good relations with Iran. In July 1979, it was reported by *Arab News* that Hua Guofeng, through a Pakistani intermediary, actually apologised to the Iranian leadership for his visit to the Shah nine months earlier.[5] With the Soviet backed Vietnamese invasion of Cambodia (in December 1978), alleged Soviet activities to depose the Shah (in the late seventies), and with the Soviet invasion of Afghanistan (in December 1979), the Chinese had few ideological compunctions about strengthening ties with the new regime in Tehran.

With the onset of the Iran–Iraq War in September 1980, China stepped in to become one of Iran's closest international partners, both diplomatically and in terms of assisting Iran's war efforts against Iraq. For China, arms sales and improved Sino–Iranian relations served a number of strategic, political and economic interests. China had enjoyed a good relationship with the Shah in the seventies, and while the leadership in Iran had dramatically changed, the strategic rationale for strong Sino–Iranian ties had not. Indeed, with the Soviet threat looming large following the invasion of Afghanistan, China was even more concerned about strengthening ties with Iran. In addition, China was able to realise billions of dollars in foreign currency during the Iran–Iraq War as a result of its arms exports to Tehran. It was within this larger strategic and economic context that the Sino–Iranian arms trade relationship was established.

The end of hostilities between Iran and Iraq in 1988 did not slow down the steady pace of development of the Sino–Iran relationship. Chinese arms exports to Iran continued, and moved beyond basic conventional weaponry to include cooperation in ballistic missiles, advanced cruise missiles, and possibly nuclear, chemical and biological assistance. The two countries also expanded their relations in other areas of political and economic cooperation, including development aid and trade. In 1996, a renewed arms agreement valued at US $4.5 billion was reached between the two sides.

[4] 'Uneasy about Soviet Presence in the Middle East', *Peking Review*, 3 August 1973, p. 20.

[5] 'Peking Leader Apologises for Official Visit to Shah', *Arab News* (Jeddah), 30 July 1979.

Throughout most of the nineties, China and Iran maintained stable and improved ties across the spectrum of political, economic and military related relations.

Contrary to widely held views, it is clear that Beijing's interest during the eighties and the early nineties to forge closer ties with Iran—including the provision of weapons—had as much to do with strategic and political considerations as to those of profit taking. Both under the Shah and the Ayatollah, Iran occupied a vital position within China's strategic frame of reference in the late seventies and throughout most of the eighties. Iran's position in the Persian Gulf and in the oil rich region has long made it an important country for China. Throughout the eighties, Iran offered a noisome presence to the Soviet southern flank throughout the latter's ill-starred occupation of Afghanistan and later maintained a fiercely independent force in the face of a powerful US presence in the region, especially after the US led coalition victory over Iraq in 1991.

Iran's revolutionary policies and strong stand against outside influence meshed well with China's policies from the late seventies to the early nineties of maintaining independence from the super powers while building Chinese regional influence. However, with the dramatic shifts in the international environment in the early nineties, much of the strategic rationale for strong Sino–Iranian ties has changed, and with it the arms trade component of that relationship. At the same time, while China's arms trade with Iran has diminished overall, China continues to offer Iran sensitive weapons and technologies. Of most concern, these exports are increasingly in the realm of technology transfers, dual-use trade and scientific assistance which are far more difficult to monitor. Such transactions may help Iran to develop a greater indigenous capacity to produce and deploy advanced conventional and mass destruction weapons.

CHINESE ARMS TRANSFERS TO IRAN

The Chinese arms trade relationship, couched as it is in a broader strategic, political and economic context, has since the early eighties covered a spectrum of conventional, missile, nuclear and chemical related activities. With the exception of Pakistan and possibly North Korea, China's arms trade relationship with Iran has been more quantitatively and qualitatively comprehensive and sustained than with any other recipient.[6] This trade has included the provision of thousands of tanks, armoured personnel vehicles and artillery pieces, several hundred surface-to-air, air-to-air, cruise and ballistic missiles as well as thousands of anti-tank missiles, more than a hundred fighter aircraft, and dozens of small warships. In addition, it is widely believed that China has assisted Iran in the development of its indigenous ballistic and cruise missile production capability, and has offered technologies and assistance in the development of its clandestine chemical and nuclear weapons programmes.

[6] On Chinese arms trade, see R. Bates Gill, *Chinese Arms Transfers: Purposes, Patterns and Prospects in the New World Order* (Westport: Praeger Publishers, 1992). China's arms exports to North Korea have been drastically curtailed since the late seventies.

Most important, China appears to have made significant contributions to Iran's indigenous military production capability through the provision of scientific expertise, technical cooperation, technology transfers, production technologies, blueprints and dual-use transfers. Such transfers are far more difficult to monitor and assess, and are likely to constitute a greater proportion of China's militarily relevant transfers to Iran in the future. While it is possible to draw together a great deal of information and analysis concerning Chinese arms transfers to Iran, it is important to note that this open source information and analysis cannot be fully verified without access to further, possibly classified, sources of information. In order to present this information in detail and to focus on areas of greatest proliferation concern, the discussion is divided into four principal parts: (*a*) anti-ship cruise missiles; (*b*) ballistic missiles; (*c*) nuclear assistance; and (*d*) chemical and biological related transfers.

Anti-Ship Cruise Missiles

China's exports of anti-ship cruise missiles to Iran has led to substantial concern both in the United States and among Iran's neighbours in the Persian Gulf. In spite of these concerns, China continued its cruise missile trade with Iran from the mid-eighties through the mid-nineties. Concerns about anti-ship cruise missile sales ran especially high during the Iran–Iraq War because of the threat these missiles posed to maritime commerce and naval vessels in the Persian Gulf, including re-flagged US vessels, oil platforms and US warships patrolling the area.

Following the conclusion of the Iran–Iraq War, the high profile public concern over China's cruise missile trade with Iran subsided somewhat. This was due in part to China's ballistic missile deals with Pakistan and Syria, and in part because the 1991 Persian Gulf War diverted American attention to the threat of Iraq and its proliferation activities. However, by the mid-nineties China's missile trade with Iran again aroused international concern, particularly in the US. Most recently, China's reported sale of C-802 cruise missiles to Iran triggered off a strong reaction in the United States, leading Congress to call for sanctions against China. In the lead-up to the October 1997 US–China summit, China apparently agreed to stop sales of anti-ship cruise missiles to Iran. A review of China's cruise missile trade with Iran can be divided into three parts: (*a*) the sale of anti-ship HY-2 ('Silkworm') missiles, mostly during the Iran–Iraq War; (*b*) the sale of C-801 missiles toward the end of the Iran–Iraq War; and (*c*) the more recent Iranian acquisitions of advanced C-802 missiles in the nineties.

During the Iran–Iraq War, one of China's most controversial arms transfers involved the HY-2 anti-ship missile, commonly referred to as the 'Silkworm'.[7] The HY-2 has a number of variations, including coast, ship and air launched versions. The missile

[7] 'HY' denotes the Chinese name for the system, *'hai ying'* or 'sea eagle'. According to some sources, the proper US designation for the HY-2 is actually 'Seersucker', Silkworm being the designation for the older HY-1 missile. However, Silkworm is the generally accepted designation for the HY-2. The export version of the HY-2 missile is also sometimes referred to as the C-201. To avoid confusion, this paper will refer to the system in question by the Chinese designation, HY-2.

uses liquid fuel, has an approximate range of 95 km, reaches speeds of up to 475 miles per hour, and carries a conventional high explosive payload of approximately 513 kg and is not generally considered a very sophisticated weapons system, even by Chinese standards. Based originally on the fifties technologies, the HY-2 was first static tested in 1966 and flight tested in 1969; and the more advanced versions, the HY-2A and HY-2B, were tested in the mid-seventies and certified in the mid-eighties. The overall development cycle of the missile was twenty years.[8] The missile raised heightened concerns in the mid-eighties when its presence in Iran was confirmed; it was among the most advanced anti-ship cruise missiles in the Persian Gulf. The first of several HY-2 shipments was delivered in the summer of 1986, and Iran successfully test-fired the HY-2 missile in February 1987.[9] The vulnerability of the US naval vessels to anti-ship cruise missiles became especially clear when the *USS Stark* was attacked by an Iraqi-fired *Exocet* missile in May 1987 and in October an American-owned tanker under the Liberian flag and a Kuwaiti tanker called the *Sea Isle City* under the US flag were both hit by Silkworm missiles.

On 22 October 1987, the Reagan Administration, following the attack on the *Sea Isle City* and dissatisfied with the Chinese responses to the US demarches, froze further liberalisation of technology sales to China. This was the first time the United States had acted against a third country for supplying weapons to Iran. The US administration apparently hoped that freezing high technology exports would put enough pressure on China and the PRC leaders would agree to halt HY-2 transfers. The administration further stepped up the pressure by hinting that the United States would consider pre-emptive air strikes on HY-2 sites in Iran, although little came of these threats. The US pressure apparently resulted in a Chinese pledge, but not necessarily in a Chinese admission or change in proliferation activities. Despite Beijing's assurances, reports indicate that China continued to sell HY-2 missiles to Iran in 1988 and 1989. Furthermore, Iran claimed in early 1988 that it had developed the capability to manufacture HY-2s and other anti-ship cruise missiles indigenously.[10] Also, after the US pressure forced China to curtail direct sales of HY-2 missiles, Iran reportedly turned to North Korea for the supply of HY-2s.[11] This clearly indicates that China's previous pledges to prevent this type of third party transfer were not enforced.

Moreover, reports in the early nineties indicated that China's assistance to Iran's HY-2 programme was continuing. However, instead of direct transfers of complete weapons, it appeared China was assisting Iran in improving its indigenous missile production capabilities. As has already been noted, Iran claimed that it had the capacity to

[8] Xie Guang et al. (Eds), *Dangdai Zhongguo de Guofang Keji Shiye (Contemporary China Undertakings in Science and Technology for National Defence)*, Vol. 2 (Beijing: Dangdai Zhongguo Chubanshe, 1992), pp. 73–81. See also Anthony Cordesman and Abraham Wagner, *The Lessons of Modern War Volume II: The Iran–Iraq War* (Boulder: Westview Press, 1990), pp. 274–77.

[9] Timothy McCarthy, 'A Chronology of PRC Missile Trade and Developments' (Monterey, CA: Monterey Institute of International Studies, 1992), p. 6.

[10] *Ibid.*, pp. 8 and 10.

[11] Andres de Lionis, 'The Coastal Missile Threat in the Middle East', *Jane's Intelligence Review*, January 1994, pp. 25–28.

produce HY-2s indigenously as early as 1988. In 1991, the US administration officials also confirmed that China was assisting in, and perhaps supervising, the construction of an Iranian missile production facility near Isfahan capable of producing the HY-2, among other missiles.[12] China also provided training to Iranian scientists in China. Iran's indigenous cruise missile programme is probably based on these production facilities and assistance, in addition to help from North Korea. Some sources suggest that, with Chinese assistance, Iran could develop turbojet or ramjet variations of the HY-2 missile, which would give the weapon a longer range and greater accuracy.[13]

Studies in the early nineties reported that China had supplied Iran with about 124 HY-2 missiles and eight launchers in the eighties.[14] If one were to add up Iran's HY-2 missiles from North Korea and those Iran has produced indigenously, it is not clear how many HY-2 missiles it has in its arsenal at present. According to recent estimates, Iran fields approximately 100 HY-2 missiles on eight to ten mobile launchers on the north side of the Straits of Hormuz.[15] In December 1993, US naval sources suspected that Iran's naval modernisation programme included the purchase of more HY-2 missiles and that Iran was attempting to upgrade its existing HY-2 arsenal by improving the accuracy and counter-measures of the missile. However, these reports did not specify whether Iran intended to import the missile from China or North Korea, or whether Chinese assistance would be involved in upgrading the guidance system.[16] Generally speaking, concerns about HY-2 sales in the eighties were displaced by concerns regarding the Chinese exports of the more advanced C-801 and C-802 anti-ship cruise missiles to Iran.

In addition to the HY-2, China also exported the C-801 anti-ship cruise missile to Iran during the Iran–Iraq War. According to one source, Iran may have imported as many as 100 C-801s and eight launchers toward the end of the Iran–Iraq War in 1987–88. According to a report in 1994, Iran at the time possessed around 200 C-801 missiles.[17] The C-801 (known as YJ-8 in China), approved for use and export by the Chinese in the late eighties, marked a significant advance over the HY-2s. The YJ-8 series was developed to have solid fuel, longer ranges and multiple launching modes, as well as fly at very low altitudes employing frequency-hopping radar to combat electronic counter-measures. The first in the series was the C-801, which has a range of 8 to 42 kilometres, a solid propellant motor, and can be launched from aircrafts, ships, shore batteries and submarines. Some sources claim that China

[12] Gordon Jacobs and Tim McCarthy, 'China's Missile Sales—Few Changes for the Future', *Jane's Intelligence Review*, December 1992, p. 561; and McCarthy, *op. cit.*, p. 19.

[13] Duncan Lennox, 'Cruise: A Missile for the 90s', *Jane's Defence Weekly*, 17 May 1994, pp. 19–20. China made similar improvements to its HY-2 missiles to produce the C-801 and C-802 missiles. Xie, et al., *op. cit.*, pp. 73–81.

[14] Gill, 'Chinese Arms Transfers', *op. cit.*, p. 213; 'N-Arms Cut Ruled Out', *Asian Recorder*, 29 January 1993, pp. 22880–81; de Lionis, 'The Coastal Missile Threat', *op. cit.*, pp. 25–28.

[15] *Jane's Strategic Weapon Systems*, No. 25, September 1997; and 'HY-2 "Silkworm" Anti-Ship Missile Detailed', *Jane's Soviet Intelligence Review*, March 1991, p. 120.

[16] Philip Finnegan, 'Iran Navy Build-up Stirs US–Arab Response', *Defence News*, 6 December 1993, p. 1.

[17] Gill, 'Chinese Arms Transfers', *op. cit.*, p. 213; and de Lionis, 'The Coastal Missile Threat', *op. cit.*, pp. 25–28.

provided Iran with the means and know-how to produce the C-801 indigenously; and the Iranian C-801 equivalent is called *Tondar*, according to one account.[18] The US defence officials reported that in June 1997 Iran tested two Chinese-built C-801 air-launched cruise missiles from an F-4 fighter. This was the first time that Iran had successfully test-fired air-launched missiles, a significant improvement in its military capability, particularly in anti-ship weaponry.

Finally, the Iranian military modernisation programme of the early nineties included the import of several military items from China, most prominently the advanced C-802 anti-ship cruise missile. The C-802 at the time, and even today, is China's top-of-the-line anti-ship cruise missile (though China is continuing its efforts to develop more advanced versions). The C-802 (Chinese name, YJ-8A) marks some important advances over the C-801. Like the C-801, it can be fired from air, land, submarine, or surface ship, and employs sea-skimming radar. But the C-802 is slightly lighter than the C-801 and employs a turbojet engine for an extended range of approximately 95 to 135 km. In 1994, there were reports that China was working on a more powerful version of the C-802 with a maximum range of up to 180 km.[19] By mid-1997, Iran reportedly possessed approximately sixty ship-launched C-802s.[20] In addition, Iran deployed a number of coastal C-802 batteries on Qeshm Island, a strategic point on the eastern side of the Arabian peninsula.[21]

In the early nineties, Iran expressed an interest in purchasing a number of C-802s from China and by 1995, in spite of initial Chinese reluctance, Iran had apparently succeeded in its efforts to acquire the C-802, and the missiles were shipped in July of that year.[22] In early January 1996, Iran first tested a Chinese C-802 cruise missile.[23] Iran stationed the C-802 missiles on all ten of its Hudong fast attack craft, the second five of which were delivered in March 1996, as well as on two French-made Combattante II (Kaman-class) patrol boats.[24] Later in March 1996, US Navy sources stated that Iran was refitting its other eight Combattante II patrol boats to carry the missiles, bringing the total number of warships carrying C-802 missiles to twenty. In November 1996, Iran successfully test-fired a C-802 from one of its Chinese fast attack craft during a series of naval exercises.[25] As was the case with the HY-2, the more long-term concern, from a non-proliferation and arms control perspective, may be China's contribution to Iran's ability to produce the C-802, or similar missiles, indigenously.

As a result of these political and non-proliferation concerns, and the fact that the US–China summit was on the horizon, US and Chinese negotiators apparently reached an agreement on the Chinese sales of cruise missiles to Iran prior to the

[18] *Jane's Strategic Weapon Systems*, No. 25, September 1997; James Bruce, 'Iran's Long-Range *Tondar* Causes Concern in West', *Jane's Defence Weekly*, 22 May 1996, p. 17.

[19] 'Naval Commander Warns of Iran Missile', *Washington Post*, 31 January 1996, p. A10; Duncan Lennox and Barbara Starr, 'Briefing: Cruise Missiles', *Jane's Defence Weekly*, 1 June 1996, pp. 19–21.

[20] Bill Gertz, 'Senate Asks for Sanctions on China', *Washington Times*, 18 June 1997, p. 13.

[21] Harold Hough, 'Iran Targets the Arabian Peninsula', *Jane's Intelligence Review*, October 1996, p. 458.

[22] 'China Deepens Arms Relationship with Iran', *Iran Brief*, 1 October 1994, p. 2.

[23] 'Iran Continues Missile Testing', *Indian Defence Review*, July–September 1996, p. 88.

[24] Bill Gertz, 'US Mulls Sanctions on China for Arms Sales to Pakistan, Iran', *Washington Times*, 8 March 1996, p. A8.

[25] 'Improved Silkworms Test-Fired', *Iran Brief*, 5 December 1996, pp. 7–8.

late October 1997 meeting of President Bill Clinton and President Jiang Zemin. The agreement was reached on 23 September 1997 during a meeting in New York between Secretary of State Madeleine Albright and Chinese Foreign Minister Qian Qichen; the latter made a verbal pledge that China would halt all future sales of anti-ship missiles to Iran.[26] By the time of the summit, it was evident that no written pledge on the missile was forthcoming from Beijing and in a White House statement at the end of October, officials noted that during the summit: 'The US and China discussed the danger posed by the provision of advanced conventional weapons to Iran which threaten maritime activities and regional stability. China has agreed to take steps to address US concerns. The United States will continue to monitor this issue'.[27] During Secretary of Defence William Cohen's visit to China in January 1998, these pledges were reiterated. Nonetheless, it is possible that some form of Sino–Iranian cooperation on cruise missiles—technical assistance and training, production technologies and sub-components—may continue.

Ballistic Missiles

While the primary concern with cruise missiles has been their implications for Iran's ability to control oil traffic in the Persian Gulf, or even to threaten foreign naval vessels, the concern about ballistic missiles is based on their possible use in attacks on land-based targets, and particularly their use as delivery systems for weapons of mass destruction. Targets in the region could include military bases or staging areas, population centres in the region, and, over the long term, targets in Israel. According to some sources, Iran had approached both the PRC and North Korea for the purchase of ballistic missiles and missile technology as early as 1985.[28] Since then, China has been directly or indirectly involved in a number of Iranian ballistic missile programmes. Most of the Chinese transfers in this area have not been complete missile systems, but in terms of designs, technology and assistance to indigenous Iranian production efforts.

The Chinese M-9 and M-11 ballistic missiles were developed for export and most (though not all) of China's controversial ballistic missile sales and technology transfer agreements have involved either of these two missiles. However, available evidence indicates that while China and Iran may have discussed the transfer of complete M-9 and M-11 missiles, it is more likely that China at most provided technical assistance in the development of such systems. In the case of another M-series missile—the M-7—it appears more credible that China made direct transfers of complete missiles to Iran.[29]

[26] Steve Erlanger, 'US Says Chinese will Stop Sending Missiles to Iran', *New York Times*, 18 October 1997, p. 1.

[27] The White House, Office of the Press Secretary, 'Fact Sheet: Accomplishments of the US–China Summit', 30 October 1997.

[28] McCarthy, *op. cit.*, p. 5.

[29] In addition to the M-series missiles, at least one report has indicated that Iran expressed an interest in purchasing the Chinese DF-3 (western name: CSS-2) in the early nineties. The DF-3 is a nuclear-capable ballistic missile with a range of approximately 2800 km. There have been no further reports of Iranian attempts to acquire that particular system. See *Bombs from Beijing: A Report on China's Nuclear and Missile Exports* (Washington, DC: Wisconsin Project on Nuclear Arms Control, May 1991).

The M-9, which is based on the Chinese DF-15 (western name: CSS-6) is a single-stage solid fuel missile with a 600 km range. China reportedly first entered into negotiations with Iran about the possible sale of M-9 missiles in late 1987, around the same time it initiated similar negotiations with Syria, Libya and Pakistan.[30] Some reports suggest that Iran may have provided a part of the funding for the development of the M-9 missile.[31] In early 1992 and again in April 1994, reports surfaced that Iran had expressed an interest in the purchase of the M-9, but these reports did not comment on the Chinese response.[32] These reports were outrightly denied by the Chinese.[33] The M-9, with its 600 km range, is clearly within the parameters of the MTCR. This may explain in part why the M-9 deal did not proceed. However, as will be discussed later, it is likely that Chinese missile technologies and assistance related to the M-9 were provided to Iran.

The M-11 is based on the Chinese DF-11 (western name: CSS-7), and is a two-stage solid fuel missile with a 300 km range. Discussions with Iran about the possible Chinese sale or joint production of the M-11 ballistic missile reportedly began in the summer or fall of 1989, and simultaneously talks on the M-9 also continued.[34] An agreement to transfer complete M-11 missiles from China to Iran may have been imminent in late 1991 and in late 1992, but the deal was apparently cancelled, modified, or postponed, following US pressure on China. In November 1991, shortly after China pledged that it would abide by the guidelines of the MTCR, US Secretary of State James Baker stated that the PRC had pledged to cancel the proposed M-11 sales to both Pakistan and Iran, as well as sales of M-9 to Syria. At the time, US sources revealed that no M-11s had yet been delivered to either Pakistan or Iran.[35]

However, China's pledge to abide by the MTCR apparently did not dampen Iranian interest in procuring Chinese M-series ballistic missiles and in early September 1992, a spokesman of the Iranian embassy in Beijing publicly stated that 500 Chinese M-11 missiles were ready to be shipped to Iran.[36] The lack of Chinese and Iranian denials in this case is puzzling and suggests that the deal was imminent, or was deliberately leaked in response to US President George Bush's announcement on 2 September 1992 to sell 150 F-16s to Taiwan.[37] A year later, in October 1993, *Defence News* reported that China and Iran had signed a US $5 billion deal for the transfer of 600 M-11 missiles.[38] But it did not indicate that any of these M-11s had been delivered, nor were there any media or government reports in the months following the September announcement that any M-11s had actually been shipped from China to Iran. By

[30] McCarthy, *op. cit.*, p. 7; 'Syria's Acquisition of North Korean "Scuds"', *Jane's Intelligence Review*, June 1991, pp. 249–51.

[31] 'Syria, Iran Want to Buy China's M-9', *Flight International* (London), 22 January 1992, p. 18.

[32] *Ibid.*, p. 18.

[33] See, for example, 'Chinese Officials Meet with JINSA', *Security Affairs*, April 1994, p. 3.

[34] McCarthy, *op. cit.*, p. 13.

[35] 'China Promises to Join NPT by March, will Follow Missile Export Guidelines', *Arms Control Today*, December 1991, p. 22.

[36] McCarthy, *op. cit.*, p. 29; 'Sino–Iran "Arms Link"', *Daily Telegraph*, 10 September 1992.

[37] 'F-16 Fracas', *Pacific Research*, November 1992, pp. 17–18.

[38] James Kraska, 'Iran Flexes Maritime Muscles in Gulf', *Defence News*, 4 October 1993, pp. 25–26.

available indications, while Iran may have been interested in the M-11, the Chinese, in accordance with their MTCR commitments, did not provide complete M-11 missile systems to Iran. China probably provided M-series technologies and assistance to Iran.

The M-7 (western name: CSS-8) is a short-range (150 km) surface-to-surface missile based on the Chinese HQ-2 surface-to-air missile.[39] The two-stage, solid propellant missile can carry a single warhead payload of 190 kg. It is derived from the so-called '8610' project in China which converted the HQ-2 into a surface-to-surface missile, a programme which was probably launched around 1985 and became operational in the early nineties. According to some reports, China shipped approximately ninety M-7 missiles to Iran in June 1992.[40] Iran denied these reports; later reports, however, revealed that some Iranian M-7s entered into service in early 1994.[41] The 1994 report of the International Institute for Strategic Studies (IISS) stated that Iran had received at least twenty M-7 missiles from China but a later IISS publication, *The Military Balance 1996/97*, estimated that Iran had 200 M-7s.[42] However, it is not clear whether Iran has directly imported all of these M-7 missiles, or whether it has converted—possibly with Chinese assistance—some of the estimated 130 HQ-2 surface-to-air-missiles it imported from China in the mid-eighties.[43] Since the M-7 is clearly a short-range missile, it is not covered by the MTCR, and its transfer, even if it had not been a secret, would not have been a violation of China's non-proliferation commitments.

The available evidence suggests that China has provided expertise, technology and production equipment related to the M-9 and M-11 programmes and as a result, Iran has developed and produced variants of these systems indigenously. As in the case of anti-ship cruise missiles, the transfer of expertise and production technology generally attracts less attention than the transfer of complete systems, but may have greater long-term significance for the military balance in the region. China's most significant contribution to Iran in the area of missile expertise, training and technology has been its assistance in the construction of missile production facilities. Iran's largest missile factory, located near Isfahan, was originally built in cooperation with North Korea, possibly with Chinese assistance. According to some sources, work on the Isfahan project probably began sometime in the early eighties, though it is not clear whether China was involved at that point.[44] Beginning in 1987–88, the Isfahan facility served as the assembly site for Iran's Scud-B missile kits, which were imported from North Korea.[45]

[39] 'Sneaking in the Scuds', *Newsweek*, 22 June 1992, pp. 42–46; 'Iran has Acquired Chinese Missiles—IISS', *Executive News Service*, 12 October 1994. Details on the M-7 are given in *Jane's Strategic Weapons Systems*, No. 25, September 1997.

[40] *Jane's Strategic Weapons Systems*, *op. cit.*; McCarthy, *op. cit.*, p. 28.

[41] Duncan Lennox, 'Ballistic Missiles Hit New Heights', *Jane's Defence Weekly*, 30 April 1994, pp. 24–28.

[42] Institute for International Strategic Studies, *The Military Balance* (London: Oxford University Press, 1996), p. 132; 'Iran has Acquired Chinese Missiles—IISS', *op. cit.*

[43] Gill, 'Chinese Arms Transfers', *op. cit.*, p. 213.

[44] McCarthy, *op. cit.*, p. 11.

[45] Martin Sieff, 'N. Korean Missiles may be Tested in Iran this Year', *Washington Times*, 16 June 1994, p. A13; 'Iran Prepares Missile Sites on Abu Masa', *Mednews*, 7 December 1994, p. 5.

Although it is not clear when China became directly involved in the Isfahan missile complex, reports of Chinese involvement surfaced in the late eighties. In January 1990, it was reported that China and Iran had signed a ten-year memorandum of understanding which covered military technical assistance; reports in the Arab press later revealed that this agreement included Chinese M-9 and M-11 technology transfers and related assistance.[46] In May 1991, US administration officials asserted that China was supervising and assisting in the construction of Isfahan missile production facility. They further added that this facility could produce, among other missile systems, the M-9 and M-11.[47] Beijing asserted that it had not assisted Iran in the production of medium-range ballistic missiles, and dismissed such reports as 'totally groundless and fabricated'.[48] The wording of Beijing's denial, however, is ambiguous, since the PRC uses different definitions of 'medium range' than those commonly accepted in the west, and it also did not deny its role in the construction and supervision of the Isfahan facility.

CHINESE ASSISTANCE TO IRAN'S SCUD AND INDIGENOUS MISSILE PROGRAMMES

In addition to providing significant assistance to Iranian production of Chinese-designed ballistic missiles, and possibly some transfers of complete systems or components, China has reportedly provided technical assistance to Iran for its indigenous missile programmes as well. Besides providing production assistance to the Isfahan facility, sources report that China has helped build a ballistic missile plant and test range east of Tehran, and may also be involved in the production of solid-fuel rockets at the Semnan facility.[49] As will be discussed later, China has allegedly provided other assistance, including guidance technologies and precision machine tools for Iran's ballistic missile programmes. US intelligence sources have repeatedly emphasised that Iran received large and significant amounts of assistance for its missile programmes from China. In June 1997, the Director of Central Intelligence reported that in the second half of 1996, China contributed 'a tremendous variety of assistance' to Iran's ballistic missile programme.[50]

For instance, while it is generally accepted that Iran's sizeable arsenal of Scud missiles was supplied primarily by North Korea rather than China (which does not produce or export Scuds), there have been reports that China has indirectly assisted Iran's Scud programme. In 1993 it was reported that Iran had begun to produce the more

[46] 'Iran, China Sign Arms Technology Pact', *Washington Times*, 22 January 1990, p. 2; McCarthy, *op. cit.*, p. 16.

[47] McCarthy, *op. cit.*, p. 19; 'Danieli at Risk in Isfahan Project', *Iran Brief*, 6 May 1996, p. 5.

[48] McCarthy, *op. cit.*, p. 26.

[49] 'Special Report: The Iranian Defence Industry', *Medneus*, 1 March 1993, p. 1.

[50] These intelligence reports are noted in Robert Shuey and Shirley A. Kan, *Chinese Missile and Nuclear Proliferation: Issues for Congress* (Washington, DC: Congressional Research Service, 29 September 1995), p. 12; Shirley A. Kan, *Chinese Proliferation of Weapons of Mass Destruction: Current Policy Issues* (Washington, DC: Congressional Research Service, 22 September 1997), pp. 6–7.

advanced Scud-C missiles, possibly with Chinese and North Korean assistance.[51] The Scud-B missile, based on thirty year old Soviet technology, has a range of approximately 300 km with a payload of 800 kg. The extended-range Scud-C is believed to have a range of between 500 and 550 km and a payload of 700 kg. According to the IISS, Iran has around 210 Scud-Bs and Scud-Cs in service.

Several other Iranian indigenous missile programmes may have also benefited from Chinese assistance. In 1994, for example, it was reported that Iran was developing a new ballistic missile, the Iran-700, probably a version of either the Chinese M-9 or the North Korean Scud-C.[52] There have been scattered reports since early 1992 of an indigenous Iranian missile called the *Tondar*-68, which was originally reported to be a 1000 km ballistic missile. It is possible that the *Tondar*-68 was based on the M-11 and/or North Korean Nodong-1 missile technologies.[53] Israeli sources report that the Iranian 1000–1500 km range *Zelzal* (Earthquake) missile was developed by the Self-Sufficiency Department of the Revolutionary Guard with technical assistance from Russia and China.[54] However, to date, the longest-range missile known to be deployed by Iran is the Scud-C, with a range of between 500 and 550 km. According to a report published by the Stockholm International Peace Research Institute (SIPRI), Iran originally wanted to acquire long-range missiles in order to deter pre-emptive strikes from Israel. However, at present, Iran's plans for long-range missiles have been curtailed, according to the SIPRI study.[55]

The most recent controversies concerning Chinese technology transfers to Iran's indigenous ballistic missile programmes are the alleged transfers of numerous missile related technologies, including sensitive gyroscopes, other advanced guidance system technology, solid fuel technology and computerised machine tools. According to intelligence reports, Chinese officials began negotiations with their Iranian counterparts over the sale of such technologies as early as 1992.[56] A 1995 report, citing CIA sources, stated that China had transferred missile system components to Iran and Pakistan. The CIA report stated that during the course of 1994–95 China had delivered dozens, if not hundreds, of computerised machine tools and missile guidance systems, supporting Iran in its efforts to increase the accuracy of its Scud missiles from North Korea, and assisting it in the production of its indigenously developed Scud-type missiles.[57] Another CIA report, entitled *Arms Transfers to State Sponsors*

[51] Dani Lesham, 'Regional NBC, Missile Delivery Capabilities', *Politiqa* (Tel Aviv), July 1993, pp. 12–15.

[52] Lennox, *op. cit.*, pp. 24–28.

[53] 'Iran Builds Its Strength', *Jane's Defence Weekly*, 1 February 1992, pp. 158–59; 'Improved Silkworm Test-Fired', *Iran Brief*, 5 December 1996, pp. 7–8.

[54] 'Missile Test Reported', *Iran Brief*, 5 May 1997, pp. 7–8.

[55] Eric Arnett (Ed.), *Military Capacity and the Risk of War: China, India, Pakistan, and Iran* (Oxford: Oxford University Press, 1997). See also, 'Iran's Missile Ambitions Scaled Down, says SIPRI', *Jane's Defence Weekly*, 16 April 1997, p. 16.

[56] Open source reports to this effect appeared in 'The New Order', *Wall Street Journal*, 18 March 1992, p. A1.

[57] Elaine Sciolino, 'CIA Report says Chinese Sent Iran Arms Components', *New York Times*, 22 June 1995, p. A1; Jeffrey Smith and David Ottaway, 'Spy Photos Suggest China Missile Trade', *Washington Post*, 3 July 1995, p. 1.

of Terrorism, leaked to the *Washington Times* in August 1996, stated that the China Precision Machinery Import & Export Corporation, the trading arm of the China Aerospace Corporation, sold missile technology and components, specifically gyroscopes, accelerometers and test equipment to Iran.

In September 1996, follow on reports indicated that China and Iran had concluded a massive deal which covered conventional weapons as well as ballistic missile technology. The deal valued at US $4.5 billion was concluded during the visit of Defence Minister Chi Haotian to Iran in August 1996. The deal would include the transfer of combat aircraft, warships and armoured vehicles as well as missile and electronics production equipment, and a military training package. It was reported that Iran would pay for the military technology in cash and oil over a period of five years, with US $1.5 billion earmarked for missile related transfers.[58] Other reports revealed that solid fuel, gyroscope and guidance technology would be used for Iran's *Zelzal*-3 missile, currently under development. Reportedly scheduled for testing sometime after 1998, it is a solid fuel missile with a range between 1000 and 1500 km.[59] In addition to solid fuel and guidance technology, China may be supplying production technology for the programme, according to some sources.[60]

Nuclear Trade and Cooperation

Since 1992, both China and Iran have argued that the Chinese transfers of nuclear assistance are legal and consistent with the provisions of Article 4 of the NPT which allows for peaceful nuclear cooperation, and that Iranian nuclear facilities are under the International Atomic Energy Agency (IAEA) safeguards. To date, based on its full-scope safeguards agreement with Iran, the IAEA noted that Iran is in full compliance with its obligations as an NPT member not to develop nuclear weapons. However, in spite of these assurances, the United States has been putting strong pressure on China and has steadily gained ground to bring Sino–Iranian nuclear cooperation to an end. Most importantly, as part of the negotiations leading up to the US–China summit of October 1997, Washington sought and received written assurances from China that it would stop all new nuclear assistance to Iran. This was the price China had to pay so that the US–China Peaceful Nuclear Cooperation Agreement of 1985 could be put into force. Nonetheless, prior to this agreement, China provided Iran with a range of nuclear related assistance, including alleged cooperation in uranium mining, uranium enrichment and conversion technologies, research reactors, production facility blueprints, and technical training and assistance.[61]

[58] James Bruce, 'Iran and China in $4.5 Billion Partnership', *Jane's Defence Weekly*, 11 September 1996, p. 3; 'Sino–Iranian Arms Deal', *Jane's Defence Weekly*, 18 September 1996, p. 13.

[59] Wyn Bowen, Tim McCarthy and Holly Porteous, 'Ballistic Missile Shadow Lengthens', *Jane's IDR Extra*, February 1997, p. 5.

[60] 'Iran's Chinese Shopping List', *Iran Brief*, 1 October 1996, p. 4.

[61] An excellent and comprehensive discussion of Iran's nuclear related imports is found in Andrew Koch and Jeanette Wolf, 'Iran's Nuclear Procurement Programme: How Close to the Bomb?', *Non-proliferation Review* (Monterey), Fall 1997, pp. 123–35.

China's nuclear cooperation with Iran probably began in the mid-eighties and in 1985, both countries signed an agreement on reactors and reactor sites, an agreement which the Chinese government did not officially acknowledge. It is generally believed that most of China's nuclear related assistance to Iran in this early period involved the Isfahan nuclear complex. The Isfahan facility began operations in 1984, but was not declared a nuclear facility until after an inspection by the IAEA in 1992.

China allegedly began to assist operations at the Isfahan nuclear research centre shortly after it began operation. In 1985, the PRC in all probability supplied two sub-critical 'training reactors' to the site (a 27 kilowatt miniature neutron source reactor and a heavy water zero power reactor). In addition, around 15 nuclear engineers from the Isfahan centre were trained in China between 1988 and 1992, and in the late eighties China reportedly sold a small electromagnetic separator called a calutron (used in uranium enrichment) for use at the Isfahan facility.[62] In 1991, it was reported that China and Iran had signed a deal under which China would sell a research reactor (20–30 megawatts) to Iran, to be located at the Isfahan site.[63]

Prior to 1991, China dismissed all reports of nuclear cooperation with Iran as 'groundless' and 'preposterous', stating that, 'China has struck no nuclear deals with Iran'.[64] China finally stopped denying reports of Sino–Iranian nuclear cooperation in November 1991, when the Chinese Foreign Ministry admitted that Chinese and Iranian companies had signed contracts for the Chinese sale of the calutron and mini-research reactor in 1989 and 1991, respectively. But the Chinese Foreign Ministry insisted that these items could be used only for peaceful purposes, such as medical diagnosis and physics research, and that the facilities would be under the IAEA safeguards.[65] The Chinese side further argued that the proposed 20 megawatt research reactor was too small to pose a proliferation threat.[66] The 1992 IAEA inspection concurred with the China–Iran position on the Isfahan project and found that the calutron at Isfahan did not appear to be part of a nuclear weapons programme and was too small to be used for uranium enrichment.[67] Moreover, the IAEA did not consider the proposed 20 megawatt research reactor project large enough to produce significant amounts of weapons-grade nuclear material.[68]

Many in the United States were sceptical, and feared that the proposed research reactor could be used to manufacture fuel for nuclear weapons and held that the

[62] 'Iran's Nuclear Weapon's Programme', *Mednews*, 8 June 1992, pp. 1–5 and 7; Shirley A. Kan, *Chinese Missile and Nuclear Proliferation: Issues for Congress* (Washington, DC: Congressional Research Service, 24 August 1992); David Albright, 'An Iranian Bomb?', *The Bulletin of the Atomic Scientists* (Chicago), July–August 1995, p. 25.

[63] Shuey and Kan, *op. cit.*, p. 11; Albright, *ibid.*, p. 25.

[64] *Xinhua* (Beijing), 'Special Memorandum: Chinese Statements on Proliferation Issues, 1979–1991', in *Foreign Broadcast Information Service—China* (hereafter *FBIS-CHI*), 18 December 1991, pp. 10–11.

[65] *Ibid.*

[66] Mark Hibbs, 'Sensitive Iran Reactor Deal may Hinge on MFN for China', *Nucleonics Week*, 1 October 1992, pp. 5–6.

[67] Kan, *op. cit.*, pp. 1–15.

[68] Hibbs, *op. cit.*, pp. 5–6.

reactor had the ability to produce up to 6 kg of plutonium per year.[69] Although the IAEA does not consider this amount significant, it is enough to manufacture one nuclear bomb.[70] Because the US believed that Iran was pursuing a clandestine nuclear weapons programme, even this small amount of weapons-grade material was enough for Washington to put pressure on China to cancel the 20 megawatt reactor deal. The United States did not apply similar pressure with regard to the calutron sale partly because it accepted the IAEA finding that this particular calutron was too small to pose a proliferation threat, and also because the calutron transfer had already been completed by September 1992.[71]

However, the termination of the 20 megawatt reactor deal did not end Sino–Iranian cooperation in small-scale nuclear research and technology projects. In February 1993, China and Iran signed an agreement under which the PRC would provide Tehran with a HT-6B Tokamak nuclear fusion reactor, to be located at Azad University in Tehran. In 1994, Chinese technical teams paid two visits to Tehran to install, test and fine-tune the reactor and in February 1995, Iran informed China that the reactor had successfully produced a 20 millisecond electromagnetic discharge.[72] However, this transfer apparently did not have any direct application to Iran's nuclear weapons programme, and it attracted minimal attention in the west.

At the same time that Washington was pressuring Beijing to cancel the 20 megawatt reactor deal, China and Iran were negotiating the sale of two 300 megawatt pressurised water reactors. On 10 September 1992, almost a month before China cancelled the 20 megawatt research reactor deal, both countries signed a nuclear energy cooperation agreement during Iranian President Hashemi Rafsanjani's visit to Beijing and this cleared the way for the sale of the 300 megawatt reactors, as well as other nuclear technology.[73] This sale was not a clandestine arrangement and both sides insisted, repeatedly and publicly, that the reactors would be used only for peaceful purposes and would be subject to the IAEA safeguards. However, the US government and military officials were concerned that the reactors in question could be used to support what the US viewed as a clandestine nuclear weapons programme in Iran. There were apprehensions that the transfer of the reactors and associated technology would include equipment to manufacture nuclear fuel rods, which could be used to generate fissile material for nuclear warheads.[74] In April 1995, the United States again issued an appeal to China to suspend the reactor sale but the latter rejected the appeal, pointing out that the sale was legal under international non-proliferation law and

[69] Shuey and Kan, *op. cit.*, p. 11; Albright, *op. cit.*, p. 25.

[70] Hibbs, *op. cit.*, pp. 5–6.

[71] Elaine Sciolino, 'China to Build Nuclear Plant for Iran', *New York Times*, 11 September 1992, p. A3.

[72] Cheng Yan, *Zhongguo Kexue Bao* (Beijing), in Joint Publications Research Service, CST-95-006, 8 March 1995; "'Transfer" of Nuclear Device to Iran Cited', *Zhongguo Tongxun She*, 21 April 1995, in *FBIS-CHI*, 24 April 1995, pp. 8–9.

[73] 'Iran Signed a Nuclear Cooperation Pact with China', *Nuclear News*, October 1992, pp. 17–18.

[74] 'Pact with China Sets Stage for Reactor Deal', *Nuclear News*, August 1993, p. 64; Elaine Sciolino, 'Beijing Rebuffs US on Halting Iran Atom Deal', *New York Times*, 18 April 1995, p. A1; R. Jeffrey Smith, 'China–Iran Talks Spark US Worry', *Washington Post*, 18 April 1995, p. A13.

reiterated that the proposed reactor was for strictly peaceful purposes and would be subject to the IAEA safeguards.[75]

However, Sino–Iranian negotiations on the reactor deal did not proceed smoothly. On 27 September 1995, Chinese Foreign Minister Qian Qichen told US Secretary of State Warren Christopher that China had unilaterally decided to cancel the sale of the two 300 megawatt power reactors to Iran.[76] The three countries appeared to have different interpretations of what had transpired. The United States apparently believed that China had decided to back out of the deal entirely, and the US indicated Qian Qichen had stated that the deal had been 'terminated'. Qian, however, later denied that the deal had been cancelled, and said that it had merely been 'suspended for the time being' because of Chinese–Iranian disagreements over the location of the reactors. In the mean time, Iran stated that it had no knowledge of any change in the status of its nuclear cooperation agreement with China.[77] By October, Iran flatly denied that the deal had been cancelled, and reiterated the Chinese position that it had merely been put on hold while the two sides negotiated over the final site for the reactors.[78]

Despite these varying interpretations, it appears that the 300 megawatt reactor deal was scrapped, even though it was not publicly cancelled by either side. On 9 January 1996, Chinese Foreign Ministry spokesman Chen Jian reaffirmed that China and Iran would continue their nuclear cooperation under the appropriate IAEA safeguards, and added that the deal to supply two 300 megawatt power reactors to Iran had been 'temporarily' frozen.[79] Although Iran's Atomic Energy Council stated that it was again interested in purchasing 300 megawatt power reactors from China in April 1997, there were no response from China.[80]

Another area of possible cooperation between China and Iran has been in uranium conversion and enrichment. As early as June 1994, there were reports of Chinese nuclear experts assisting in the construction of uranium enrichment plants at Rudan and Shiraz. According to some US experts, the town of Fasa, in the Shiraz region, was to be the site of a Chinese-constructed uranium hexaflouride (UF6) plant.[81] The conversion of uranium ore into UF6 gas is a key step in the process of uranium enrichment, and reports of the UF6 plant project therefore caused considerable concern.

[75] 'China Rejects US Plea not to Sell Iran 2 Reactors', *International Herald Tribune* (New York), 18 April 1995, p. 1.

[76] Elaine Sciolino, 'China Cancels Deal for Selling Iran 2 Reactors', *New York Times*, 28 September 1995, p. A1.

[77] Jeffrey Parker, *Reuters Insurance Briefing*, 29 September 1995; *IRNA* (Tehran), 28 September 1995, in *FBIS-NES*-95-190, 28 September 1995; *Nuclear Proliferation News*, 12 October 1995, p. 14.

[78] Mark Hibbs, 'Iran, China said to Disagree Only on Site Selection for New PWRs', *Nucleonics Week*, 5 October 1995, pp. 1 and 8–9.

[79] 'Foreign Ministry Holds Regular News Conferences on Nuclear Cooperation with Iran', *IRNA* (Tehran), in *FBIS-CHI*-96-008, 9 January 1996.

[80] Alan George, 'Revival of Iran's Nuclear Ambitions Causes Alarm', *Jane's Intelligence Review & Jane's Sentinel Pointer*, April 1997, p. 6.

[81] *Intelligence Newsletter* (Paris), 23 June 1994, p. 5; *Iran Brief*, 1 June 1995, p. 11.

Although enriched uranium has civilian applications, Iran's desire to construct its own UF6 plant was indicative of an intention to use the enriched uranium in a clandestine nuclear weapons programme. Iran could purchase enriched uranium for its civilian reactors on the international market for a fraction what it would cost to develop an indigenous uranium enrichment capability.[82]

Throughout 1994 and 1995, reports on the China–Iran UF6 plant project, as well as other uranium enrichment related technology transfers poured in. In September 1994, western intelligence sources believed that Iran had acquired gas centrifuge design data from China and was seeking other components and technology, including the UF6 plant, that would enable its military to enrich uranium for its clandestine nuclear weapons programme.[83] Following April reports surfaced that China was assisting in the construction of Iranian uranium purification and conversion (UF6) facilities.[84] Other reports around the same time revealed that China may be prepared to proceed with the transfer of technology for uranium mining, conversion and fuel fabrication to Iran. In response to these reports, China's Ambassador to the Conference on Disarmament (CD) Sha Zukang declared on 1 May 1995 that China had never sold uranium enrichment, reprocessing, or heavy water production technologies abroad.[85]

In July 1995, a high ranking US official declared that in addition to uranium reprocessing facilities, China had assisted Iran in developing uranium mining, fuel fabrication and zirconium tube production, and may provide uranium metal and UF6 plants in the near future.[86] In September China's Ambassador to Iran conceded Chinese sales of uranium enrichment technology and other nuclear technology to Iran. However, he claimed that the technology sold to Iran was entirely for peaceful purposes and part of an agreement signed ten years earlier. This statement contradicted Sha Zukang's previous denial as well as a statement by the Chinese Foreign Ministry spokesman Chen that China, 'has never exported any sensitive technology or equipment concerning reprocessing and enrichment of uranium... this report is groundless'. The same day Iranian officials flatly denied that China had sold Iran uranium enrichment technology, apparently retracting the Chinese Ambassador's previous claim.[87]

In early 1996, China informed the IAEA of the proposed sale of a uranium conversion facility to Iran, and added that it planned to go ahead with the sale under the appropriate IAEA safeguards. Iran clarified that the facility was for peaceful purposes and would be used to manufacture fuel rods for its civilian nuclear programme.[88] The plant was reportedly close to completion by early 1997, and was scheduled to become

[82] 'US Protests Chinese Hex Plant', *Iran Brief*, 3 July 1997, p. 1.

[83] *Risk Report* (Washington, DC), September 1995, pp. 1–4.

[84] 'China Rejects US Plea not to Sell Iran 2 Reactors' *International Herald Tribune*, 18 April 1995, p. 1; Albright, *op. cit.*, p. 25.

[85] *Xinhua*, in *FBIS-CHI*, 19 April 1995, pp. 1–2; Gregory Polyanichko, 'On Russia's Nuclear Reactor Sale to Iran, Ukranian Relations', *Post-Soviet Nuclear & Defence Monitor*, 12 June 1995, pp. 12–15.

[86] Albright, *op. cit.*, pp. 21–26.

[87] *Xinhua*, in *FBIS-CHI*, 26 September 1995, p. 1; 'Nuclear Cooperation with Iran: A Confused Picture', *Nuclear Proliferation News*, 12 October 1995, p. 14.

[88] R. Jeffrey Smith, 'China May Cancel Proposed Sale of Nuclear Facility to Iran', *Washington Post*, 6 November 1996, p. 9.

operational by the year 2000.[89] However, following the agreement concluded during the US–China summit of October 1997, it appears that the UF6 conversion plant will not be completed with Chinese assistance but reports indicate that China did agree to provide Iran with the blueprints necessary for the construction of the plant.[90]

Twelve to eighteen months prior to the US–China summit of October 1997, it became clear to US negotiators that China would have to take several steps for the proposed certification of the 1985 US–China Peaceful Nuclear Cooperation Agreement. The presidential certification that China was not assisting other countries' nuclear weapons programmes would allow US companies to engage in civil nuclear trade with China. In 1996 and 1997, US officials held several rounds of talks with the Chinese to secure critical agreements that would facilitate the presidential certification of the 1985 nuclear accord and assure improved US–China relations. First, Washington wanted China to establish public regulations on nuclear exports that were comprehensive, nationwide, include dual-use items, and were 'catch-all'. Second, the US wanted China to join the Zangger Committee, a group of nuclear suppliers working together to harmonise their nuclear export controls and abide by a specific list of nuclear technologies and equipment which are subject to careful monitoring and controls. China sat in as an observer at the meeting of the Zangger Committee in May 1997, and formally joined as a full member in October 1997. Third, the United States wanted China to strictly adhere to its May 1996 pledge not to provide nuclear assistance to unsafeguarded nuclear facilities. Finally, US negotiators sought written assurances from China that it would not provide nuclear related assistance to Iran.

As the summit drew near, reports in August 1997 revealed that Chinese Deputy Prime Minister Li Lanqing had offered assurances to the visiting Israeli Prime Minister Benjamin Netanyahu in Beijing that China would not provide nuclear reactors to Iran but the Chinese Foreign Ministry did not comment on this development.[91] Around the same time, unnamed sources at the IAEA revealed that Iran had postponed the construction of three nuclear power facilities, two of which were to be built with Chinese assistance. According to the report, Iran cited financial problems as the cause of the delay.[92] During the US–China summit in October 1997—on the day of the formal meeting between the two presidents—'authoritative, written communications' were given confidentially to the United States stating that China would not offer any new nuclear assistance to Iran. Under the agreement, China would complete two existing projects which did not lead to proliferation concern in the United States: the construction of a zero power research reactor that uses natural uranium and heavy water and a zirconium cladding production factory. Following the completion of these

[89] 'Chinese to Deliver Hex Plant, Despite Assurances', *Iran Brief*, 6 January 1997, p. 5; 'China has Far to go Before US will Certify, Agencies Now Say', *Nucleonics Week*, 12 December 1996, p. 1.

[90] John Pomfret, 'US May Certify China on Curbing Nuclear Exports', *Washington Post*, 18 September 1997, p. A28.

[91] 'Iran: China Urged to Clarify Israeli Report on Nuclear Decision', in *FBIS-TAC*, 25 August 1997. 'China Silent on Whether Iran Nuclear Sale Shelved', *Reuters*, 26 August 1997; Jay Bushinsky, 'China Promises PM: No Nuclear Aid to Iran', *The Jerusalem Post*, 25 August 1997.

[92] *Al-Sharq al-Awsat* (London), in *FBIS-NES*, 26 August 1997 (on-line version).

projects, China would not provide new, follow-on assistance to them. Specifically, the two sides agreed that China would not provide assistance for the power reactors and UF6 conversion plant which were under discussion.[93] In October 1997 US National Security Advisor Sandy Berger declared: 'We have received assurances from the Chinese that they will not engage in any new nuclear Cooperation with Iran and that the existing Cooperation—there are two projects in particular—will end. That is the assurance we have received'.[94]

CHEMICAL AND BIOLOGICAL RELATED TRANSFERS

Iran began its pursuit of an offensive chemical weapons capability in the early eighties, in response to mustard gas attacks on Iranian troops by the Iraqis. These Iraqi attacks led to approximately 50,000 casualties.[95] According to the US Department of Defence, Iran was able to deliver chemical agents against enemy troops by 1987, and had produced hundreds of tons of blister, blood, and choking agents.[96] However, China's precise contribution to this programme is difficult to assess on the basis of these open sources. As an original signatory to the CWC in January 1993, and having ratified the treaty and joined its governing body as a founding member in 1997, China is under the strictest obligations not to assist countries in the development of chemical weapons. Iran, too, has signed and ratified the CWC, and is under similar international obligations. China is not a member of the Australia Group, a multilateral body of states which aims to discourage and impede chemical and biological weapons (CBW) proliferation by harmonising national export controls on CBW precursors. The United States invited China to join the Australia Group in May 1997, but China declined the offer.

Several US government sources indicated Chinese 'chemical warfare-related' exports to Iran and added that Iran has 'obtained considerable chemical weapon (CW)-related assistance from China in the form of production equipment and technology'.[97] In an April 1997 testimony, Deputy Assistant Secretary of State Robert Einhorn, who is charged with monitoring proliferation concerns, stated:

[93] 'China Agrees to End Nuclear Trade with Iran when Two Projects Completed', *Nuclear Fuel*, 3 November 1997, pp. 3–4.

[94] The White House, Office of the Press Secretary, 'Press Briefing by Secretary of State Madeleine Albright and National Security Advisor Sandy Berger', 29 October 1997; R. Jeffrey Smith, 'China's Pledge to End Iran Nuclear Aid Yields US Help', *Washington Post*, 30 October 1997, p. 1.

[95] Robert Karniol, 'China Supplied Iran with Decontamination Agent', *Jane's Defence Weekly*, 30 April 1997, p. 17.

[96] *Proliferation: Threat and Response* (Washington, DC: Office of the Secretary of Defence, April 1996), p. 15. An extensive and detailed study of Iranian chemical weapons programmes can be found in Anthony H. Cordesman, *Iranian Chemical and Biological Weapons* (Washington, DC: Centre for Strategic and International Studies, 30 July 1997).

[97] *The Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions—July–December 1996* (Washington, DC: Central Intelligence Agency, June 1997); *Proliferation: Threat and Response* (Washington, DC: Office of the Secretary of Defence, April 1996), p. 15.

> We. . . welcome China's adoption in December 1995 of its chemical export control regulation and the supplement to that regulation issued in March of this year. We are deeply concerned, however, by the discrepancy between these positive steps and substantial information available to us that various Chinese entities have transferred chemical precursors, chemical production equipment, and production technology to Iran, which we expect will use them in its chemical weapons programme, one of the most active in the world today.
>
> These dual-use chemical-related transfers to Iran's CW programme indicate that, at a minimum, China's chemical export controls are not operating effectively enough to ensure compliance with China's prospective CWC obligation not to assist anyone in any way to acquire chemical weapons.[98]

Regarding its chemical related exports, China stated, 'the governments of importing countries provide assurances that the relevant goods imported from China not be used to manufacture chemical weapons or re-transferred to a third country'.[99]

To date, one of the most controversial chemical related exports from China to Iran resulted in the imposition of US sanctions against Chinese companies and persons. On 21 May 1997, the US government imposed a set of sanctions against five Chinese citizens, two Chinese companies and a Hong Kong company for exporting such commodities as dual-use chemical precursors and chemical production equipment and technology which would contribute to Iran's chemical weapons programme. Since the US Administration could not prove government complicity, these sanctions did not extend to either the Chinese or Hong Kong governments. This was the first time the United States had imposed sanctions against Chinese entities for chemical weapons proliferation activities.

On 30 October 1997, the *Washington Times*, citing a classified US intelligence report, stated that China had assisted Iran in the completion in June of a dual-use factory for the manufacture of glass-lined equipment that can be used to produce chemical weapon precursors; the export of such equipment is controlled by the Australia Group. The Chinese company, the Nanjing Chemical and Industrial Group, involved in the construction of this factory was one of three Chinese companies sanctioned by the United States in May 1997 for chemical related exports to Iran. The report mentioned undelivered orders of 49 metric tons of alkyl dimethylamine (used to produce detergent) and 17 metric tons of sodium sulphide (used to produce mustard gas) from China's North Chemical Industries Corporation (NOCINCO). Also mentioned in the report was a Chinese company, Q Chen (related to one of the individuals sanctioned in May 1997), which was 'a major supplier of glass-lined equipment and chemicals to Iran's chemical weapons programme'.[100]

[98] Testimony by Robert J. Einhorn, Deputy Assistant Secretary of State for Non-proliferation, before the Subcommittee on International Security, Proliferation, and Federal Services, Senate Committee on Governmental Affairs, 10 April 1997.

[99] *China: Arms Control and Disarmament* (Beijing: Information Office of the State Council of the People's Republic of China, November 1995).

[100] Bill Gertz, 'China Aided Iran Chemical Arms', *Washington Times*, 30 October 1997, p. 1.

China has a huge chemical industry but lacks adequate mechanisms to monitor and enforce export controls on the industry. Moreover, the dual-use nature of many chemical related exports renders the task of policing such transfers difficult, even for countries with greater export control experience. Chinese exports of potentially threatening chemical agents and technologies is likely to continue, though it appears that the Chinese government is determined to closely monitor and prevent such exports.

As in the case of chemical weapons, Iran began to seriously consider the biological weapons option in the early eighties, during the Iran–Iraq War. The CIA reported that Iran has stocks of biological agents and weapons, and in a number of cases Iranian entities linked to military agencies have sought to procure equipment and commodities with the potential for biological weapons production. However, the open source evidence provides only limited substantiation of an Iranian biological weapons programme.[101] China's involvement in that programme, if any, is even more difficult to verify from open sources.

In 1984 China became a member of the Biological Weapons Convention (BWC), a 1972 agreement in which signatories agreed not to develop, produce, stockpile, or acquire biological agents or toxins. However, the BWC at present does not include enforcement and verification provisions such as those in the NPT or the CWC. In 1995 China's white paper on arms control and disarmament stated: 'China has consistently advocated a complete prohibition and thorough destruction of biological weapons. It opposes the production of biological weapons by any country and their proliferation in any form by any country'.[102]

According to a US intelligence official, China sold Iran dual-use equipment and vaccines with both civilian medical and biological weapons applications.[103] This report pointed out some of the problems inherent in tracking biological transfers for weapons use: the dual-use nature of most biological research and production activities means that they can be relatively easily turned over to weapons use, making it often very difficult to differentiate between civilian and military end uses.

ENCOURAGING PROGRESS, CONTINUING CONCERNS

China's trade with Iran in missiles as well as nuclear, chemical and biological related systems and technologies is and should be of continuing concern to the existing arms control and non-proliferation arrangements. At the same time, one should not lose sight of the very encouraging steps China has taken, particularly during the past three to five years, to stem the flow of sensitive weapons and technologies to Iran. The key

[101] For an extensive and detailed study of Iranian biological weapons programmes see Cordesman, *op. cit.*
[102] *China: Arms Control and Disarmament*, *op.cit.*
[103] Bill Gertz, 'Albright Concedes "Concern" over China–Iran Transfers', *Washington Times*, 24 January 1997, p. 6.

to assuring that such developments continue will be to clearly identify the causes and sources of possible breach of Chinese non-proliferation commitments, and to work with the Chinese as well as with the international community to enhance China's ability to comply with the non-proliferation goals it has set for itself. In short, it is a question of closing the gap between Chinese policy and practice. At least two broad trends suggest that the Chinese arms trade relationship with Iran will become increasingly difficult to sustain over the long term. The first involves China's slow but steady acceptance of global arms control and non-proliferation norms beginning in the early eighties and accelerating over the course of the mid-nineties. It is still early to say if this trend will be sustained over the long-term, but initial signs are encouraging.

For example, in the nineties alone, China joined the NPT (1992); it agreed bilaterally with the United States to abide by the parameters of the MTCR (1992); it signed the CWC (1993), ratified the treaty (1997), and joined the CWC's governing body as a founding member (1997); it urged North Korea to negotiate the agreed framework with the United States which had frozen Pyongyang's nuclear weapons programme (1994); it went along with the indefinite extension of the NPT (1995); it withdrew the offer of a 300 megawatt Qinshan civil nuclear power reactor to Iran (1995); it unilaterally placed a moratorium on its nuclear testing and signed the CTBT (1996); it agreed to stop all exports of anti-ship cruise missiles to Iran and agreed to comply with the United States' appeal to stop all nuclear related assistance to Iran. These steps are part of a broader post-Cold War trend which finds China increasingly integrating itself in the international community, and accepting a greater role as a major power.

The second broad trend which points to the difficulty of sustaining China's arms trade relationship with Iran is related to a diminishing strategic and political rationale for Sino–Iranian ties. Several factors illustrate this trend. First, China's relationship with the Soviet Union/Russia—the difficulties which were a crucial factor in fostering Sino–Iranian ties in the first place—has dramatically changed. The two countries have now established a 'strategic partnership' and continue to strengthen their relationship. The strategic partnership between China and Russia has strengthened China's international position in relation to the United States and other western powers such as Japan with which China shares the greatest mid to long-term concerns. In the past, countries such as Iran could help China assert its independence and gain regional influence in its relationship with major powers, but this is a role that Russia can play far better.

Third, the new international environment implies that Iran has been able to tap increasingly alternative sources of weaponry. With its defence industries reeling under the impact of economic and political collapse, Russia finds in Iran a willing cash customer which prefers more sophisticated Russian arms to Chinese weapons. As a result, Chinese exports have narrowed down to areas where it has some proven expertise and to systems other countries are less willing to export, such as cruise missiles, ballistic missiles and nuclear related technologies. But even in these areas, China cannot compete with potential exports from Russia. Fourth, as China's economic modernisation advances in the nineties, its dependence on foreign sources of energy has radically increased and is likely to increase further. As a result, it is likely to be increasingly concerned about the stability of the oil rich Persian Gulf region.

CONTINUING CONCERNS

In spite of these encouraging developments, a number of serious questions and concerns remain. Addressing these concerns should be the joint task of China and the international community in their efforts to stem the proliferation of sensitive weapons and technologies. First, concerned observers must ask whether the observed progress could have been achieved in the absence of the leverage afforded by the US–China summit and other incentives and disincentives. There is no clear answer to this question as the record appears mixed. It seems that China engages in constructive non-proliferation activities when there is a significant degree of US pressure, and when this pressure is representative of clearly established international non-proliferation norms. Second, in the past, there have been a number of occasions when China and the US differed over their respective interpretations of non-proliferation assurances. These varying interpretations leave the door open for other sales or technology transfers which are not explicitly covered by the pledges made by China. Unfortunately, with pledges and loosely worded agreements, it is often the spirit rather than the letter which is violated.

Third, there are a number of concerns as to how well the Chinese can establish, implement and enforce the explicit non-proliferation commitments they have undertaken. Some of the positive steps China has taken—such as promulgating nuclear, chemical and conventional weapon export controls, and joining the CWC and the Zangger Committee—will demand a more robust and effective export control system in China. Such a system not only requires the 'hardware' of customs monitoring and enforcement at export points, but also the 'software' of accepting non-proliferation norms throughout the government and industrial communities.

These problems relating to export control are exacerbated by the fact that the Chinese defence industrial base is beset with enormous socio-economic and techno-industrial difficulties. Responsible for the employment and social well-being of hundreds of thousands of workers and their dependents, but with diminishing military procurement orders at home and abroad, some industries—such as in aerospace, nuclear technology and chemicals—will naturally seek money-making opportunities wherever they arise. This is a recipe for potentially threatening exports of sensitive systems and technologies.[104] Moreover, some parts of the Chinese defence industrial base are benefiting from close ties with external sources of know-how and technology, particularly Russia and Israel. These cooperative activities could over the long term allow China to export increasingly sophisticated systems and technologies to countries of concern.[105]

Fourth, another problem is the changing nature of Chinese weapons and military related exports. Such Chinese exports are and will continue to be increasingly in

[104] See John Frankenstein and Bates Gill, 'Current and Future Challenges Facing Chinese Defence Industries', *China Quarterly* (London), No. 146, June 1996, pp. 394–427.

[105] On Chinese imports of weapons and military technologies, see Bates Gill and Taeho Kim, *China's Arms Acquisitions from Abroad: A Quest for 'Superb and Secret Weapons'* (Oxford: Oxford University Press, 1995).

the realm of technology transfers, scientific assistance, production technologies, sub-components and dual-use transfers. These transfers will be far more difficult to monitor than exports of complete plants or weapon systems, even if China has every intention to strictly prohibit illicit exports. This problem is not unique to China, but is a universal non-proliferation dilemma facing all industrialised economies. As legitimately traded commercial technologies in many cases have military applications, one can only expect that as China's economy grows, so too will its exports of potentially sensitive systems and technologies. To address these many potential difficulties, while at the same time building on the positive non-proliferation measures taken by China, will not be an easy task. Sensitive exports from China to Iran will not cease overnight, and will continue over the short- to medium-term. Careful consideration must be given to formulation of policies which slow down the pace of sensitive Chinese exports to Iran while encouraging positive Chinese non-proliferation policies and actions.