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Iranian Arms Transfers: The Facts

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Political campaigns are a poor time to debate complex military issues, particularly when the debate is based on press reports and political statements that are skewed to stress the importance of the story at the expense of objective perspective and the facts. Iran does represent a potential threat to US interests, and it has carefully focused some of its limited conventional modernization efforts on threatening tanker traffic through the Gulf.

Iran, however, has not carried out a major conventional arms build-up or received destabilizing transfers of advanced conventional weapons. The violations of US and Russian agreements have been minor, have had little military meaning, and been more technical than substantive. The net result is that Iran faces major military problems in many areas because of its lack of conventional modernization. The real threat it poses is one driven by its efforts to proliferate, rather than conventional arms transfers.

Iranian Military Expenditures

Iran has cut its military expenditures since the Iran-Iraq War, and it has done so in spite of the fact it lost some 40-60% of its holdings of major land weapons during the climatic battles of the war in 1988, and much of its military inventory is becoming obsolete. US government estimates indicate that Iran's real defense spending is now less than one-half of the level it reached during the Iran-Iraq war, but that Iranian military expenditures still average over $4.0 billion a year.

Measured in constant 1997, dollars, Iran's military expenditures peaked in 1986, at a cost of well $15 billion. They dropped from $8.3 billion to $6.8 billion immediately after the cease-fire in the Iran-Iraq War, when Iran clearly made a decision not to try to pay to recoup its losses during that war. They then dropped from $7.2 billion in 1990 to $4.2 billion in 1992 after Iran assessed the degree to which the UN Coalition destroyed much of Iraq's military capability in the Gulf War. They were $5.0 billion in 1993, $4.8 billion in 1994, $3.6 billion in 1995, $3.9 billion in 1996, and $4.7 billion in 1998. Ironically, they rose after the US imposed sanctions in an effort to cut them.[i]

To put such spending levels in context, Egypt's total spending during 1990-1995 averaged around $1.7 to $2.7 billion. Iraq's expenditures averaged around $10 billion during 1988-1991, but no firm recent figures are available. Kuwait's spending reached peaks of $15 billion a year during 1990-1992, but dropped to $3.2 to 3.6 billion from 1993-1995. Turkey has recently spent between $6 billion and $7 billion. The UAE spends around $1.8 to 2.2 billion annually, and Saudi Arabia spends $17.2 to $20 billion.[ii]

There are differences of opinion within the US government over the size of these Iranian military expenditures. For example, US intelligence experts felt in 1994 that Iran had spent up to $8 billion on military forces in 1993, while ACDA estimated only $4.9 billion. The CIA issued revised estimates in 1995 that stated it could not make accurate conversions of expenditures in Iranian Rials to dollars, but indicated that Iran had reported it had spent 1,785 billion Rials on defense in 1992, including $808 million in hard currency, and 2,507 billion Rials in 1993, including $850 million in hard currency.[iii]

The International Institute of Strategic Studies (IISS) has also produced different figures. It estimates that Iran's economic problems and defeat in 1988 reduced Iran's defense spending from $9.9 billion in 1987/88, to $5.8 billion in 1989/90, $3.2 billion in

1990, $5.8 billion in 1991, $1.8-2.3 billion in 1992, $4.86 billion in 1993, $2.3 billion in 1994, $2.5 billion in 1995, $3.6 billion in 1996, $4.7 billion in 1997, $5.8 billion in 1998, $5.7 billion in 1999, and $7.5 billion in 2000.[iv]. The IISS estimates that Iran spent only $1.3 billion on procurement in both 1995 and 1996. [v]

There is little debate, however, that the average level of Iranian defense spending dropped sharply after the end of the Iran-Iraq War and remains relatively low. At some point in the mid-1980s, Iran chose to make major cuts in its total military spending in spite of the fact that it was still fighting the Iran-Iraq War. The most likely explanation is that it no longer felt that Iraq could succeed in winning the war, but it may also have been unable to sustain the peak level of spending it reached in 1986.

Iranian Arms Transfers

These trends in total military spending inevitably affect Iran's arms imports and military modernization efforts. They help explain why Iran faces major problems in modernizing and expanding its forces, and continues to have problems with interoperability, standardization, and quality. At the same time, declassified US intelligence data on Iranian arms transfers reveal patterns that follow indicate the reasons for Iran's actions are more complex than the economics of Iranian military spending.

- Chart One compares Iranian and Iraqi arms deliveries and shows that Iran faced a far less serious threat after the arms embargo the UN placed on Iraq in mid-1990.

- Chart Two shows that Iran seems to have made a strategic decision after its defeat in the Iran-Iraq War not to engage in a major conventional arms build-up and to concentrate on economic development. It then made much more serious cuts in its arms buys after the UN's shattering defeat of Iraq in 1991, and could sustain these cuts because Iraq has remained under an arms embargo ever since. Ironically, the US efforts to sanction Iran coincided with the first real rise in Iranian arms deliveries since the end of the Iran-Iraq War.

- Chart Three shows that Iran has made major cuts in its new arms agreements with Russia since 1996, and has increasing had to rely on lower quality suppliers like China.

- Chart Four -- and Charts Five through Ten at the end of this analysis -- show the trends in Iranian conventional arms transfers relative to those of the rest of the Gulf states. They make it clear that Iran's arms transfers have been very limited by the standards set by the Southern Gulf states.

The more detailed patterns in Iranian arms transfers over time reinforce the points made in these charts. These trends in total military spending inevitably affect Iran's arms imports and military modernization efforts. They help explain why Iran faces major problems in modernizing and expanding its forces, and continues to have problems with interoperability, standardization, and quality. At the same time, declassified US intelligence data on Iranian arms transfers reveal patterns that follow indicate the reasons for Iran's actions are more complex than the economics of Iranian military spending.

During the mid-period in the Iran-Iraq War, Iran was unable to obtain arms from the US, Russia, or the major West European powers – its former major suppliers. It signed only $10 million worth of agreements with the FSU, only made covert arms purchases from the US as part of the Iran-Contra deal, and bought $865 million worth of relatively unsophisticated weapons from the major West European powers. It did, however, buy $3,835 million from other European powers, most in Eastern Europe. It

bought $1,845 million from China, and $2,385 from other states. These included large buys of arms from North Korea, and buys of parts and surplus US equipment from Vietnam.[vi]

Iran made a major effort to acquire most sophisticated arms from the FSU in the years that followed. It signed $10.2 billion worth of new arms agreements during the four-year period between 1987-1990 -- the time between the final years of the Iran-Iraq War and the Gulf War. It signed $2.5 billion worth of agreements with Russia, $3.4 billion with China, $200 million with Western Europe, $2.1 billion with other European states (mostly Eastern Europe), and $2.1 billion with other countries (mostly North Korea). It is also clear that Iran began to concentrate its limited resources on higher quality arms following the end of the Iran-Iraq War, and cut back on the purchases of large amounts of towed artillery, munitions, and low quality weapons it had needed for a war of attrition with Iraq. [vii]

Iran's new arms agreements dropped sharply, however, during the four-year period following the Gulf War. They totaled only $4.8 billion during 1991-1994.[viii] Despite some reports of massive Iranian military build-ups, new agreements during 1991-1994 totaled only a quarter of the value of the agreements that Iran had signed during the previous four years. It signed $1.2 billion in new agreements with Russia, but only $400 million with China, $100 million from other European states (mostly Eastern Europe), and $900 million from other countries (mostly North Korea. Iran got no new orders from the US and only $100 million from Western Europe.[ix]

It is difficult to discuss trends precisely because some US government reporting only declassifies data for blocks of several years, and these blocks of time are not always comparable. However, the US estimates that Iran signed only $1.3 billion worth of new arms agreements during 1993-1996 -- a period heavily influenced by an economic crisis inside Iran, low oil revenues, and problems in repaying foreign debt. Iran ordered $200 million from Russia, $300 million from China, $100 million with other European states (mostly Eastern Europe), and $600 million from other countries (mostly North Korea).[x] The drop in agreements with Russia reflected both Iran's financial problems and the result of US pressure that had led President Yeltsin not to make major new arms sales to Russia. Iran's new agreements with China and North Korea heavily emphasized missiles and missile production technology.

If one looks at deliveries over the period from 1992-1995, Iran took delivery on a total of $3 billion worth of arms, versus only $1.1 billion worth of new orders. The difference is explained by Iran's large backlog of orders that can take one to five years to deliver. It obtained $1.7 billion worth of arms from Russia, $700 million from China, $100 million from major West European states, $200 million from other European states, and $300 million from other powers.[xi]

Iran signed $1.1 billion worth of new arms agreements during 1996-1999 -- a period still heavily influenced by an economic crisis inside Iran, low oil revenues, and problems in repaying foreign debt. Iran ordered only $200 million worth of new arms agreements from Russia, $800 million from China, and $100 million from other

countries.[xii] The drop in new arms agreements with Russia reflected both Iran's financial problems and the result of US pressures that had led President Yeltsin not to make major new arms sales to Iran. Iran's new agreements with China and North Korea heavily emphasized missiles and missile production technology.

Arms deliveries followed a different pattern, again reflecting the delay between orders and deliveries. The US State Department reports that Iran took delivery on $1.6 billion worth of arms in 1991, $859 million in 1992, $1.4 billion in 1993, $390 million in 1994, $330 million in 1995, $350 million in 1996, and $850 million in 1997, as measured in current dollars.[xiii] Once again, it is interesting to note that Iranian arms import efforts actually *increased* after the US imposed sanctions.

If one looks at the source of deliveries during this period, Russia delivered $700 million worth of arms between 1996 and 1999. This largely reflected the backlog of orders from the period before the US and Russia reached an agreement that Russia would not provide destabilizing transfers of conventional weapons. Iran also took delivery on $700 million worth of arms from China and $300 million from other sources.[xiv] However, declassified US estimates of new Iranian arms purchases during 1998-1999 do present a statistical problem. If one compares the reporting for two different blocs of time, the difference between the two reporting periods implies that Iran signed a total of $500 million worth of new arms agreements with Russia between 1998 and 1999. Unfortunately, the US data do not explain what Iran bought, or if such statistical differences are even relevant. The reporting on the Iranian order of battle certainly does not indicate any deliveries reflecting such orders.[xv]

If one looks at the entire period between 1992 and 1999, Iran signed only $2.2 billion worth of new arms agreements, but took delivery on $$4,700 worth. Iran ordered a total of $400 million in new arms agreements from Russia, $1000 million from China, $500 million with other European states (mostly Eastern Europe), and $300 million from other countries (mostly North Korea). [xvi]

In short, the overall patterns in Iranian arms transfers reflect what seem to be clear strategic decisions by Iran that it did not have to cripple its economy to buy new arms after its defeat by Iraq in 1988, and that it could then afford to make further cuts in arms buys after Iraq's conventional forces were shattered in the Gulf War in 1991. At the same time, Iran was driven to cut its arms buys by severe internal economic problems, and by the fact the US had considerable success in limiting Iran's access to advanced arms from Europe and Russia between 1995 and 1998.

These patterns do not mean that all of Iran's military efforts were crippled, or that it did not make some important arms buys. Iran mad a number of carefully focused arms purchases that helped correct some of the more critical weaknesses in its land, air, and naval forces. It also bought a mix of submarines, missile patrol boats, mines, torpedoes, and anti-ship missiles that greatly improved its capability to threaten shipping in the Gulf, Strait of Hormuz, and Gulf of Oman, and potentially to intimidate its neighbors.

It is also clear that the effectiveness of the US-Russian agreement to limit arms transfers that was signed in 1995 may be eroding, particularly in the area of missiles and weapons of mass destruction. The previous figures on the value of conventional arms transfers do not include many of the costs of Iran's efforts to proliferate, which are discussed in detail in Chapter IX. Iran seems to have made a strategic decision to emphasize weapons of mass destruction over conventional arms. It is also one of the ironies of US efforts to sanction Iran that Iran increases its expenditures on both proliferation and conventional arms after the Clinton Administration signed Executive Orders sanctioning Iran and the US Congress passed ILSA.

Finally, while Iran has not yet mass produced any major modern weapons systems, it is also important to note that it has made major efforts to reduce its dependence on imports, and has demonstrated a number of key weapons prototypes:

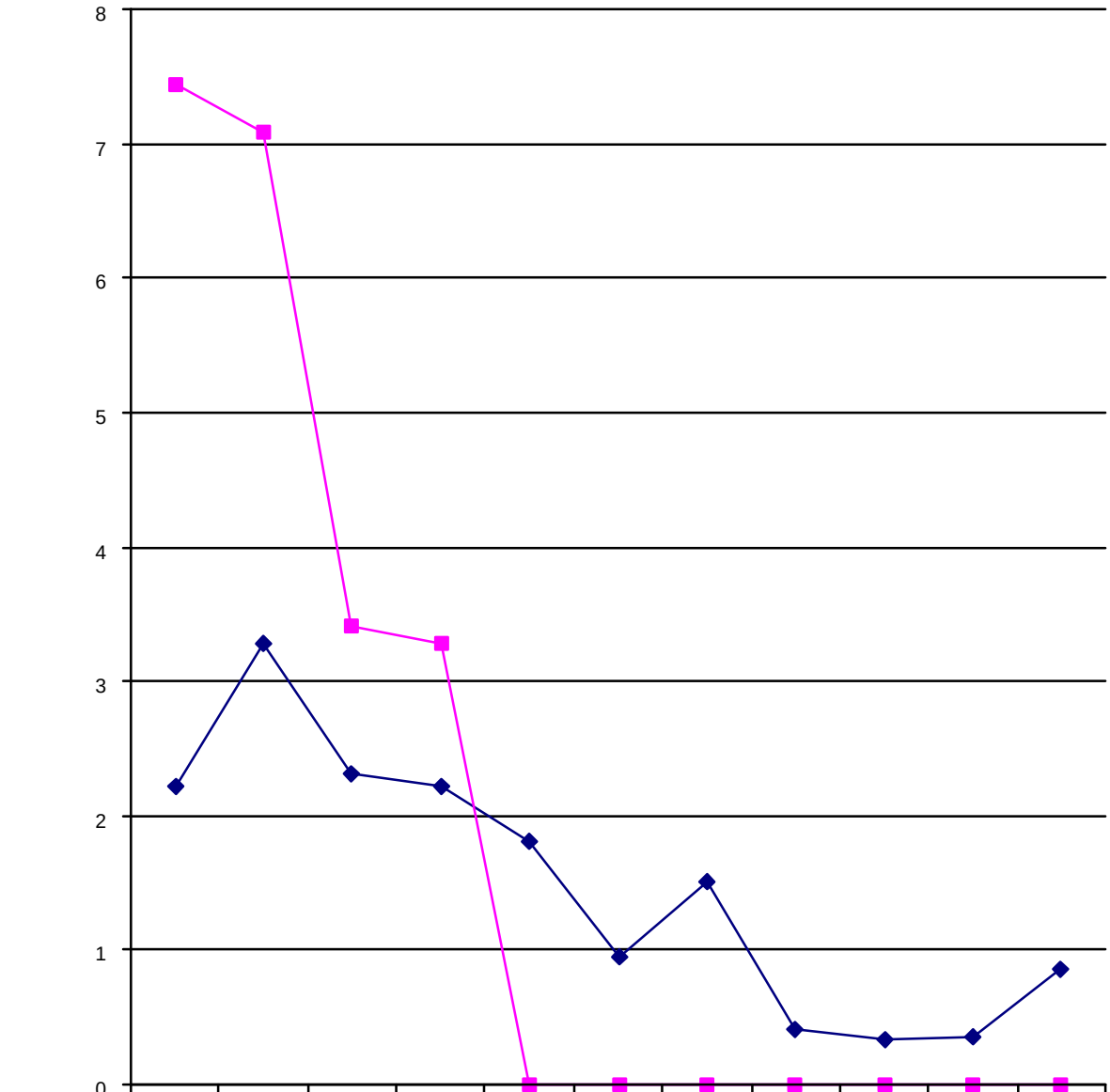
- Showed prototype of a main battle tank called the Zulfiqar (Zolfaqar) in 1994. Tank has undergone field trials ever since the Velayat military exercises of May 1996. Its drive train and suspension seems to be modeled on the US-designed M-48A5 and M-60A1 series of tanks and to have either a 105 mm or 125mm rifled gun. Reports differ as to the Zulfiqar's production status. One report indicates that Iran announced on July 8, 1997, that President Rafsanjani opened the "first phase" of a plant to produce the tank in Dorud, some 300 kilometers southwest of Tehran. Another report indicates that it will be produced at the Shahdid Industrial Complex.
- Claims ready to produce light tank for "unconventional warfare" called the Towan (Wild Horse) with 90 mm gun.
- Developed Iranian-made modification of the Chinese Type WZ 501/503 armored infantry fighting vehicle which Iran calls the Boragh. The WZ 501/503 is itself a Chinese copy of the Russian BMP, and is 30 year old technology.
- Displayed APC called the Cobra or BMT--2, which seems to be an indigenous design armed with a 30 mm gun or the ZU-23-2 anti-aircraft gun -- a light automatic weapons system that Iran has been manufacturing for some years. Like the Zulfiqar, the Cobra has been undergoing field trials in Iranian military exercises since May 1996.
- Produces a copy of the Russian AT-3 9M14M (Sagger or Ra'ad) anti-tank guided missile.
- Claimed in May 1996, to have produced a self-propelled version of a Russian 122 mm gun that it called the Thunder-1, with a firing range of 15,200 meters and a road speed of 65 kilometers per hour.[xvii]
- Makes military radios and low-technology RPVs like the 22006, Baz, and Shahin.
- Claims to have built its first Iranian-designed helicopter, and to have tested a locally-built fighter plane. Brigadier General Arasteh, a deputy head of the General Staff of the Armed Forces (serving under Major General Ali Shahbazi, the joint chief of staff) stated in April, 1997 that the "production line of this aircraft will begin work in the near future."
- Defense Industries Organization has claimed that Iran was soon going to start producing two trainers, a jet-powered Dorna (Lark) and propeller-driven Partsu (Swallow).
- Iranian military has claimed that Iran has begun mass production of a jet strike aircraft, the Azarakhsh (Lightning), which reportedly resembles the F-4 Phantom (JDW 4 November 1998: 20). Iran has reportedly developed a TV-guided missile for carriage on F-4 Phantoms
- Iran claims to have deployed an air-to-air adapted variant of the SM1 Standard missile for its fleet of F-4D/E Phantom II fighter bombers. (JDW 29 April 1998: 17)

- President Rafsanjani announced on October 11, 1997, that Iran had test-launched a major new surface-to-air missile system with a range of 250 kilometers, although he gave no further details. The description of the missile sounded vaguely like the Russian SA-5, which is deployed in Iran. Reports Iran has acquired four HQ-23/2B (CSA-1) launchers and 45-48 missiles, plus 25 SA-6, and 10-15 SA-5 launchers.
- Claims to produce advanced electronic warfare systems.
- Claims will soon start producing 6 multi-purpose destroyers, with initial production run of three.
- Iran claims to be developing non-magnetic, acoustic, free-floating and remote controlled mines. It may have also acquired non-magnetic mines, influence mines and mines with sophisticated timing devices.
- Iran is developing FL-10 anti-ship cruise missile that is copy of Chinese FL-2 or FL-7.
- Reportedly assembled domestic variants the YJ-1 (C-801) solid-propellant anti-ship missile under the local name of Karus, and the YJ-2 (C-802) turbojet-powered anti-ship missile under the local name of Tondar (JDW 9 December 1998)

Chart One

Iran Reacts to the Threat: Decline in Iranian and Iraqi New Arms Deliveries

(In Constant 1997 $US billions)



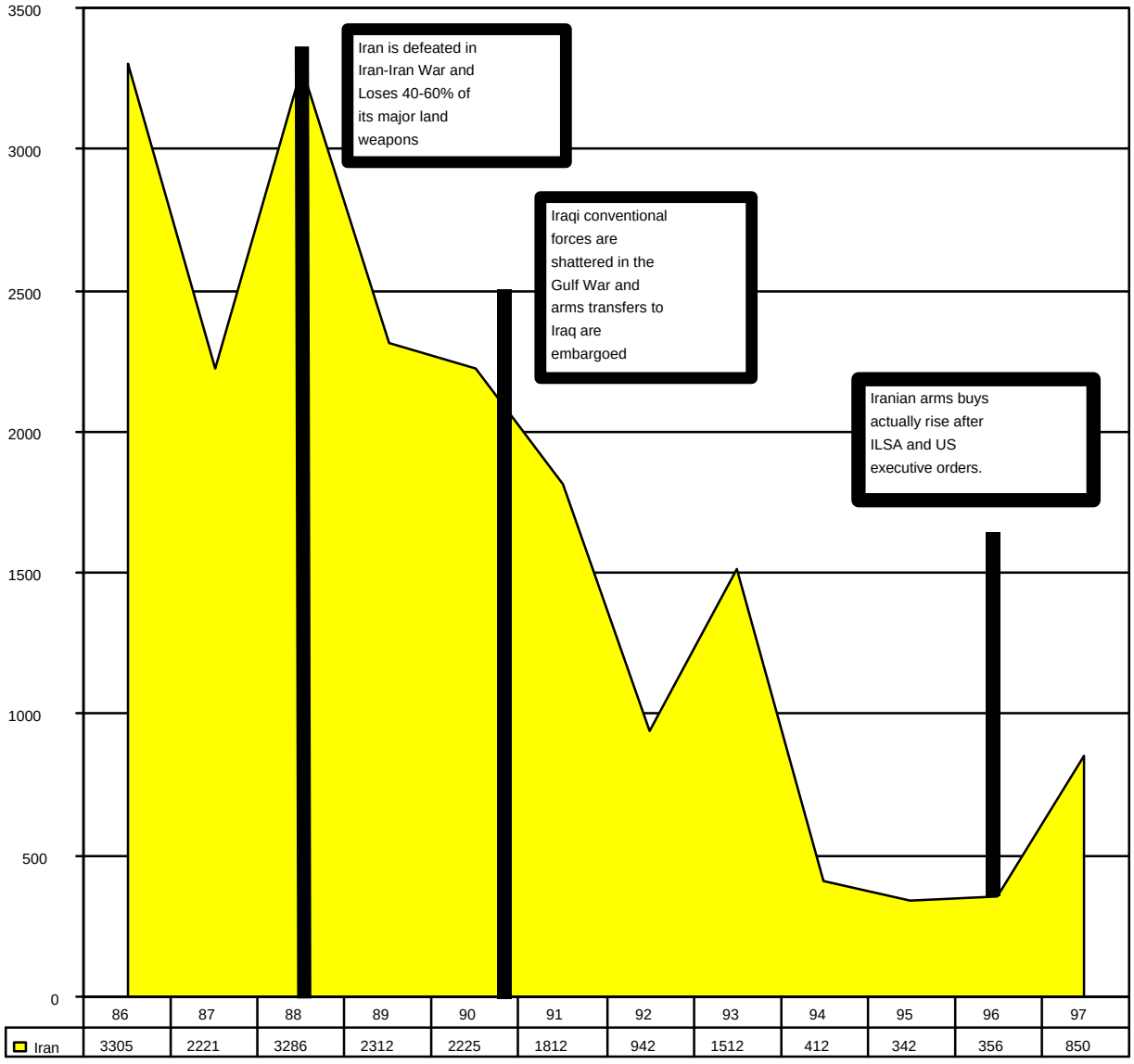
	87	88	89	90	91	92	93	94	95	96	97
Iran	2.221	3.286	2.312	2.225	1.812	0.942	1.512	0.412	0.342	0.356	0.85
Iraq	7.448	7.078	3.407	3.279	0	0	0	0	0	0	0

Source: Adapted by Anthony H. Cordesman from ACDA database for Table IIIA in State Department Bureau of Arms Control World Military Expenditure and Arms Transfers report.

Chart Two

Cumulative Arms Imports of Iran - 1984-1997

(Value of Deliveries in Constant $1997 Millions)

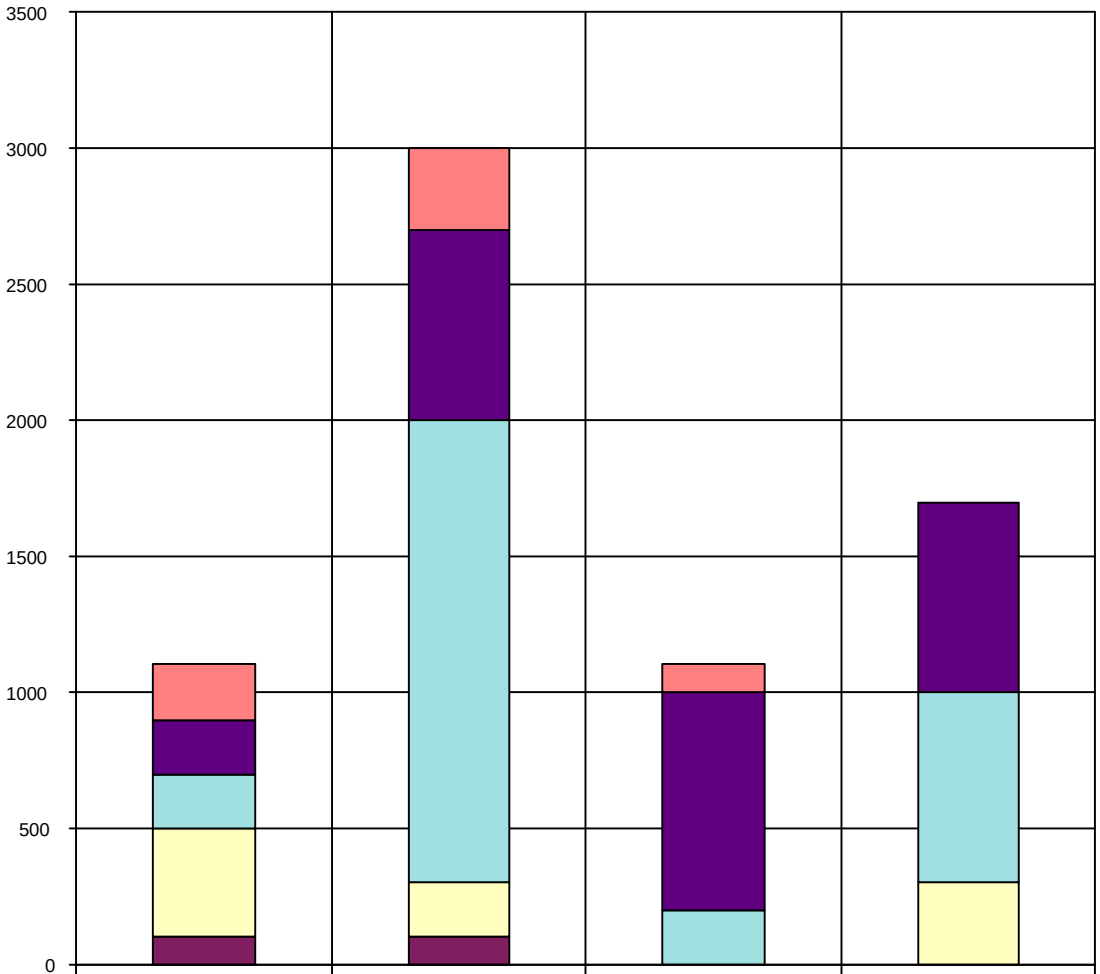


Source: Adapted by Anthony H. Cordesman from US Arms Control and Disarmament Agency, World Military Expenditures and Arms Transfers, GPO, Washington, various editions.

Chart Three

Major Supplier Share of Total Iranian New Arms Agreements and Deliveries: 1996-1999

($Current US Billions)



	New Agreements: 92-95	Deliveries:92-95	New Agreements: 96-99	New Deliveries: 96-99
All Others	200	300	100	0
China	200	700	800	700
Russia	200	1700	200	700
All Other Europe	400	200	0	300
Major West Europe	100	100	0	0
US	0	0	0	0

0 = less than $50 million or nil, and all data rounded to the nearest $100 million.
Source: Richard F. Grimmett, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

Chart Four

Gulf Arms Buys by Supplier: 1987-1999

(New Arms Agreements in Current US $millions)

Buyer Country	Supplier Country						
	US	Russia	China	Major West European	Other European	All Others	Total
Iran							
1987-90	0	3,500	2,300	200	1,200	1,600	8,800
1991-94	0	200	200	100	100	600	1,200
1995-98	0	200	800	0	300	100	1,400
1996-99	0	200	800	0	100	0	1,100
Iraq							
1987-90	0	300	700	500	500	1,000	3,000
1991-94	0	0	0	0	0	0	0
1995-98	0	0	0	0	0	0	0
1996-99	0	0	0	0	0	0	0
Bahrain							
1987-90	300	0	0	0	0	0	300
1991-94	200	0	0	0	0	0	200
1995-98	500	0	0	0	0	0	500
1996-99	500	0	0	0	0	0	500
Kuwait							
1987-90	2,500	200	0	200	200	200	3,300
1991-94	3,500	800	0	1,800	0	100	6,200
1995-98	900	0	200	700	100	0	1,900
1996-99	800	0	200	100	0	0	1,100
Oman							
1987-90	100	0	0	600	0	0	700
1991-94	0	0	0	500	0	100	600
1995-98	0	0	0	300	100	100	500
1996-99	0	0	0	300	100	0	400
Qatar							
1987-90	0	0	0	0	0	0	0
1991-94	0	0	0	2,000	0	0	2,000
1995-98	0	0	0	900	0	0	900
1996-99	0	0	0	800	0	0	800
Saudi Arabia							
1987-90	18,800	200	300	23,000	2,300	200	44,800
1991-94	15,600	0	0	6,600	100	0	22,300
1995-98	5,100	0	0	1,700	800	300	7,900
1996-99	5,500	0	0	400	900	300	7,100
UAE							
1987-90	300	0	0	300	0	400	1,000
1991-94	300	500	0	3,900	100	0	4,800
1995-98	100	400	0	6,000	800	100	7,400
1996-99	300	400	0	6,000	800	200	7,700

0 = less than $50 million or nil, and all data rounded to the nearest $100 million.
Source: Richard F. Grimmett, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

Focused Poverty and Asymmetric Threats

Iran's low expenditures on arms do not mean that it has not increased some aspects of its military capabilities. Iran is clearly aware of the threat posed by US technology and war fighting methods, and of the need to modernize its forces. While it has never published detailed force plans, Iranian military literature reflects a keen interest in major force modernization plans and in the advanced weapons and technologies that support the "revolution in military affairs".

At various times, Iran has sought to procure a wide variety of advanced weapons, and been able to take advantage of some aspects of technology diffusion. On the other hand, Iran's revolutionary economy has remained weak, and Iran's mismanagement of its budget, development, and foreign debt has reduced Iran's access to military technology and arms. "Sanctions" on arms purchases in the form of diplomacy and supplier regimes have been far for effective than economic sanctions. The US and its allies have blocked many transfers of advanced arms to Iran, particularly from Europe and Russia, although such efforts have scarcely been leak-proof.

Iran's has attempted to deal with these problems by focusing on acquiring weapons of mass destruction, enough advanced armored and air weapons to give its some defensive or deterrent capability, and on making larger purchases of systems that can threaten tanker traffic and the Southern Gulf. Iran has bought enough arms to rebuild its army to the point where it can defend effectively against a weakened Iraq. It has begun to rebuild its air force and land-based air defenses, and can put up a far more effective defense than in 1988.

It has restructured its regular forces and the Iranian Revolutionary Guards Corps to improve the defense of its Southern Gulf coast and develop a far more effective ability to attack naval forces, tanker traffic, offshore facilities, and targets along the Southern Gulf coast. It is this "focused poverty" that makes Iran potentially dangerous in spite of its relatively low level of arms imports and the obsolescence or low quality of much of its order of battle.

Recent Iranian Purchases and Purchasing Efforts

Iran's key purchases and procurement efforts reflect these priorities. Although Iran's imports have been severely limited relative to Iran's overall needs, they do include the following arms imports and Iranian development and military production efforts:

LAND

- Russian, and Polish T-72 Exports. Some reports indicate Iran has procured as many as 380 T-72Ss from Russia, and 100 T-72M1s from Poland since 1990. This would give it an inventory of about 480 T-72s. The IISS, however, reports only 120 T-72s and 75 T-62s on hand in 2000, plus a possible additional 100 T-72 kits ordered in 1989 and delivered in 1998.
- Claims to be producing the Iranian-made Zolfaqar MBT, an M-48/M-60-like tank.
- Has upgraded to T-54/T-54 called "Safir-74. Claims to have upgraded Iraqi T-54s captured in Iran-Iraq War. Has 400 T-54/55 in inventory. Number of upgrades unknown.
- Purchased Russian BMPs. Inventory of 300 BMP-1s and 140 BMP-2s in 2000. The IISS, reports a possible additional 100 BMP-2 kits ordered in 1989 and delivered in 1998.

- Russia may be licensing Iranian production of T-72 and BMP-2.
- Claims domestic production of a Chinese version of the BMP called the Boragh.
- Claims Domestic production of an APC called the BMT-2 or Cobra.
- Possible purchase of 100 M-46 and 300 D-30 artillery weapons from Russia.
- Testing prototype of 122 mm self-propelled gun called Thunder.
- Has shown a modified heavy equipment transporter called the "Babr 400."
- Russian and Asian AT-2s, AT-3s, and AT-4s. Does not seems to include 100 Chinese Red Arrows.
- Chinese and 15+ North Korean 146 mm self-propelled weapons
- Has 60 Russian 2S1 122 mm self-propelled howitzers in inventory.
- Growing numbers of BM-24 240 mm, BM-21 122 mm and Chinese Type 63 107 mm MRLs
- Iranian Hadid 122 mm - 40 round MRL
- Manufacturing Iranian Arash and Noor rockets (variants of Chinese and Russian 122 mm rockets)
- Manufacturing Iranian Haseb rockets (variants of Chinese 107 mm rocket)
- Manufacturing Iranian Shahin 1 and 2, Oghab, Nazeat 5 and 10 (may be additional versions), and Fajr battlefield rockets

AIR/AIR DEFENSE

- Keeping up to 115 combat aircraft that Iraq sent to Iran during Gulf War. Seem to include 24 Su-4s and four MiG-29s.
- Has 30 MiG-29s with refueling in inventory, may be receiving 15-20 more from Russia
- Has 24-30 Su-24s in inventory (probably Su-24D version), may be receiving 6 to 9 more from Russia
- May be negotiating purchase of AS-10, AS-11, AS-12, AS-14/16s from Russia
- Has Su-25s (formerly Iraqi), although has not deployed.
- May be trying to purchase more Su-25s, as well as MiG-31s, Su-27s and Tu-22Ms
- Considering imports of Chinese F-8 fighter and Jian Hong bomber
- Has 25 Chinese F-7M fighters with PL-2, PL2A, and PL-7 AAMs.
- IISS reports that Iran bought 14 Y-7 transports and 10 F-7 fighters from China in 1996 and these were delivered in 1998.
- Has purchased 25 Brazilian Tucano trainers and 25 Pakistani MiG-17 trainers. Uncertain report has bought 12 MiG-29UB trainers from Russia.
- Has bought 12 Italian AB-212, 20 German BK-117A-3, and 12 Russian Mi-17 support and utility helicopters.
- Iran claims to have fitted F-14s with I-Hawk missiles adapted to the air-to-air role
- Claims to produce advanced electronic warfare systems.
- IRGC claims to be ready to mass produce gliders.

LAND-BASED AIR DEFENSE

- May be negotiating purchase of S-300 and more SA-14/16s from Russia

- Has acquired four HQ-23/2B (CSA-1) launchers and 45-48 missiles, plus 25 SA-6, and 10 SA-5 launchers.
- Has acquired Chinese FM-80 launchers and a few RBS-70s
- More SA-7s and HN-5s man-portable missiles; may have acquired 100-200 Strelas.
- Reports is seeking to modernize Rapier and 10-15 Tigercat fire units
- May be modifying and/or producing ZSU-23-4 radar-guided anti-aircraft guns.
- Claims to produce advanced electronic warfare systems.

SEA

- Claims will soon start producing 6 multi-purpose destroyers.
- Has taken delivery on three Russian Type 877EKM Kilo-class submarines, possibly with 1,000 modern magnetic, acoustic, and pressure sensitive mines.
- Wake-homing and wire-guided Russian torpedoes: TEST 71/96 HWT/LWT).
- Reports has North Korean midget submarines have never been confirmed
- Has obtained 10 Hudong-class Chinese missile patrol boats with CS-802.
- US Mark 65 and Russian AND 500, AMAG-1, KRAB anti-ship mines
- Reports that Iran is negotiating to buy Chinese EM-52 rocket-propelled mine
- Iran claims to be developing non-magnetic, acoustic, free-floating and remote controlled mines. It may have also acquired non-magnetic mines, influence mines and mines with sophisticated timing devices.
- Seersucker (HY-2) sites with 50-60 missiles - Iran working to extend range to 400 km.
- Has 60-100 Chinese CS-801(Ying Jai-1 SY-2) and CS-802 (YF-6) SSMs.
- Iran is developing FL-10 anti-ship cruise missile which is copy of Chinese FL-2 or FL-7.
- Boghammer fast interceptor craft

MISSILES

- Obtained up to 250-300 Scud Bs with 8-15 launchers
- Up to 150 Chinese CSS-8 surface-to-surface missiles with 25-30 launchers.
- Reports that China is giving Iran technology to produce long-range solid fuel missile
- Iran-130 missile (?)
- Has bought North Korean Scud Cs with 5-14 launchers
- South Korea reports Iran has bought total of 100 Scud Bs and 100 Scud Cs from North Korea.
- May be developing the Zelzal-3 missile with a range of 900 kilometers with Chinese and North Korean support.
- Iran may be planning to purchase North Korean No-Dong 1/2s
- Iran also interested in North Korea's developmental Tapeo Dong 1 or Tapeo Dong 2.
- Claims will launch its first experimental satellite by 2000 with Russian aid.
- Reports of tunnels for hardened deployment of Scuds and SAMs.

CBW

- Chemical weapons (sulfur mustard gas, hydrogen cyanide, phosgene and/or chlorine; possibly Sarin and Tabun)

- Biological weapons (possibly Anthrax, hoof and mouth disease, and other biotoxins)
- Nuclear weapons development (Russian and Chinese reactors)

Iran's Problems with Obsolescence

At the same time, neither Iran's arms imports or production efforts have come close to offsetting the impact of its underspending on military modernization, and its relative "poverty" in arms imports. Iran still has a force structure filled with obsolete and obsolescent military equipment. Iran's procurements to date cannot compensate for the steady decay of Iran's older equipment. Its Western equipment is now at least two decades old and received hard use during the Iran-Iraq War. Most of the arms that Iran bought during the Iran-Iraq War consisted of relatively low grade North Korean and Chinese equipment and few of its indigenous production efforts have yet gone beyond the prototype stage.

Iran's holdings of aging and obsolete equipment include:

LAND FORCES

- Chieftain tank 140 Worn, under-armored, underarmed, and underpowered. Fire control and sighting system now obsolete. Cooling problems.
- M-47/M-48 150 Worn, under-armored, underarmed, and underpowered. Fire control and sighting system now obsolete.
- M-60A1 150-160 Worn, under-armored, underarmed, and underpowered. Fire control and sighting system now obsolete.
- Scorpion AFV 70-80 Worn, light armor, underarmed, and underpowered.
- M-114s? 70-80 Worn, light armor, and underarmed, and underpowered
- M-113s 250 Combat worn, not modernized
- M-109 155 mm SP 150-160 Worn, Fire control system now obsolete. Growing reliability problems due to lack of updates and parts.
- M-107 175 mm SP 20-30 Worn, Fire control system now obsolete. Growing reliability problems due to lack of parts.
- M-110 203 mm SP 25-30 Worn, Fire control system now obsolete. Growing reliability problems due to lack of parts.
- AH-1J Attack heli. 100 Worn, avionics and weapons suite now obsolete. Growing reliability problems due to lack of updates and parts.
- CH-47 Trans. heli. 35-40 Worn, avionics now obsolete. Growing reliability problems due to lack of updates and parts.
- Bell, Hughes, Boeing, Agusta, Sikorsky helicopters 350-445 Worn, Growing reliability problems due to lack of updates and parts.

AIR FORCE

- F-4D/E FGA 35-50 Worn, avionics now obsolete. Critical problems due to lack of updates and parts.
- 60 F-5E/FII FGA 50-60 Worn, avionics now obsolete. Serious problems due to lack of updates and parts.

- F-5A/B 10-20 Worn, avionics now obsolete. Serious problems due to lack of updates and parts.
- RF-4E 8-15 Worn, avionics now obsolete. Serious problems due to lack of updates and parts.
- RF-5E 0-5 Worn, avionics now obsolete. Serious problems due to lack of updates and parts. (May be in storage)
- F-14 AWX 60 Worn, avionics now obsolete. Critical problems due to lack of updates and parts. Cannot operate some radars at long ranges. Phoenix missile capability cannot be used.
- P-3F MPA 5 Worn, avionics and sensors now obsolete. Many sensors and weapons cannot be used. Critical problems due to lack of updates and parts.
- Key PGMs - Remaining Mavericks, Aim-7s, Aim-9s, Aim-54s are all long past rated shelf life. Many or most are unreliable or inoperable.
- I-Hawk SAM 100 Worn, electronics, software, and some aspects of sensors now obsolete. Critical problems due to lack of updates and parts.
- Rapier SAM 30 Worn, electronics, software, and some aspects of sensors now obsolete. Critical problems due to lack of updates and parts.
- Tigercat SAM 15 Worn, electronics, software, and some aspects of sensors now obsolete. Critical problems due to lack of updates and parts.

NAVY

- Alvand FFG 3 Worn, weapons and electronics suite obsolete, many systems inoperable or partly dysfunctional due to Critical problems due to lack of updates and parts.
- Bayandor FF 2 Obsolete. Critical problems due to lack of updates and parts.
- Hengeman LST 4 Worn, needs full scale refit.
- Riazi MSC 2 Obsolete US ships.
- P-3F Orion MPA 3 Now obsolete. Not modernized or upgraded since 1978.
- SH-3D, AB-212 ASW 20 Worn, obsolescent ASW helicopters.

Iran and Conventional Warfighting

Iran is too weak to seek a direct conflict that involves the US, or to risk another war with Iran. It will also be years before Iranian arms imports and military production efforts can give it enough capability to deliberately initiate a conflict or reveal whether it has aggressive intentions. Iran can threaten shipping traffic in the Gulf, but its acquisitions do not give it any hope of winning a naval-air battle against US forces in the Gulf, and it has little chance of doing so in the foreseeable future.

Iran would have to rebuild and modernize both its regular navy and air force at levels of strength and capability it simply cannot hope to achieve in the next decade. Alternatively, it would need to develop its capabilities to deliver weapons of mass destruction to the point where it could back its conventional military capabilities with a threat that might seriously inhibit US military action and/or the willingness of Southern Gulf states to support the US and provide air and naval facilities.

The "wild cards" determining the outcome of such contingencies are the US determination to act, the size of the US presence in the Gulf and US power projection capabilities at the time of a given crisis, Southern Gulf support for the US and willingness to provide the US with suitable facilities, and the political liabilities the US would face -- if any -- in terms of the response from nations outside the region. Far more is involved in a confrontation in the Gulf than military capability, and Iran would have far more contingency capability if the US could not respond for political or budgetary reasons.

Iran could also try to threaten US interests indirectly and through asymmetric wars. Iran has a major capability to engage in asymmetric warfare in the Gulf. It could covertly lay free floating mines, launch hit and run attacks against offshore oil platforms and shipping with its missile patrol boats, and invade and occupy offshore facilities with the naval branch of its Revolutionary Guards. At the same time, it cannot project power across in the Gulf in the face of US opposition, and has never really exercised large-scale over-the-beach amphibious operations. Furthermore, there is little present near-term prospect that Iran will develop enough power projection capability -- and supporting power from its navy and air force -- to win a conflict in the Southern Gulf that involves US forces, or to force its way in support of a coup or uprising.

At the same time, the US might still have problems in exploiting its military superiority and the "revolution in military affairs" to counter Iranian military involvement in the Southern Gulf:

- Iran might seek to exploit the fracture lines and political unrest within and between the Southern Gulf states. This is particularly true of the Shi'ite in Bahrain and Saudi Arabia, but it might also prove true of future confrontations between Bahrain and Qatar and Saudi Arabia and Yemen.
- The US would face serious problems in responding to any change of government in a Southern Gulf state that resulted in a pro-Iranian regime and which sought Iranian military advice or an Iranian military presence. The US cannot save a Gulf regime from its own people or (openly) endorse such action by other Southern Gulf countries.
- Iran's process of creeping proliferation is making enough progress that the US and the Southern Gulf states must reach some degree of agreement on taking suitable counter-proliferation measures. A power vacuum in which Iran proliferates, the Southern Gulf states grow steadily more vulnerable, and US resolve seems progressively more questionable could give Iran far more capability to directly or indirectly intervene in Southern Gulf affairs.
- Iran might threaten regional stability by exploiting internal unrest and divisions in Iraq that are serious enough to split the Iraqi armed forces, and/or lead to a new Shi'ite uprising. Similarly, a major Kurdish uprising would greatly complicate Iraq's ability to concentrate its forces to defend against an Iranian attack on Iraq's center and south. At the same time, any Iranian victory over Iraq might prove to be more apparent than real. It would be dependent on US toleration of such an Iranian victory that did more than depose the present Iraqi regime. Further, the split between Persian, Arab, and Kurd seems likely to remain so great that Iraqi independence would rapidly reassert itself if Iran attempted to occupy or dominate a substantial part of Iraq.

The previous contingencies assume that Iran will take offensive action. If it does, it may well be confronted with a US-led attack on Iran. If this attack is confined to naval and coastal targets, particularly those Iranian military capabilities that potentially threaten Gulf shipping, there is little Iran can do militarily to resist US power other than try to ride out the attack by dispersing and hiding its smaller boats, anti-ship missiles, etc.

If a US-led attack includes strategic conventional missile strikes and bombings, there also is little Iran can do in immediate response other than escalate by using weapons of mass destruction. Such an escalation now would almost certainly end in increasing the risk and damage to Iran than deter or damage US forces.

Iran, however, does have potential countermeasures to US conventional superiority and ability to exploit the revolution in military affairs. It can respond over time with terrorism, unconventional warfare, and proxy wars. It is much easier for air and missile power to inflict major damage on Iran than it is to predict or control the political and military aftermath. The resulting casualties and damage will be extremely difficult to translate into an "end game."

Attacks on the Iranian mainland that went beyond a punitive raid would also be much more costly to the US, in spite of the "revolution in military affairs." A US-led coalition could defeat Iran's regular forces, but would have to be at least corps level in size, and occupying Iran would be impractical without massive land forces of several entire corps. Even limited amphibious and land attacks on the mainland would expose the invading forces to a much higher risk of low intensity and guerrilla combat with Iranian forces that would constantly receive reinforcement and resupply. Further, Iran's use of terrorism and weapons of mass destruction would be politically easier to justify in a defensive conflict than an offensive one. Such attacks would probably end in futility, and in creating a revanchist Iran.

Iran and Asymmetric Wars

Iran may be able to counter US capabilities and achieve some of its objectives through intimidation and direct and indirect threats. Iran's ability to provide such threats and conduct "wars of intimidation," will improve steadily in the near to mid-term, in spite of its military weakness. In many cases, its neighbors may be willing to react to such intimidation by accommodating Iran to some degree. This is particularly true of those Southern Gulf states whose gas and oil resources are most exposed -- like Qatar -- or which see Iraq as a more serious threat -- like Kuwait.

Iran has steadily improved the capabilities of the IRGC and the Quds Force for unconventional warfare, including the potential use of chemical and biological weapons. Iran has also demonstrated that it is steadily improving its ability to conduct "proxy wars" by training, arming, and funding movements like the Hezbollah.

Iran also is steadily improving capabilities for information warfare and cyberterrorism, although it seems unlikely that it is capable of advanced attacks on protected US military and US government computer, information, and battle management systems. Iran probably has more capability to attack the US private sector and the systems of Gulf states. It also is almost certainly improving the defense of its own systems, which often are land-based and require little more than isolation from netted or open systems to provide a first line of defense.

These capabilities allow Iran to conduct the kind of low-level and/or covert asymmetric warfare where the "revolution in military affairs" as of yet has only limited value. At the same time, any use of such forces is unlikely to drive the US out of the Gulf, and would risk alienating the Southern Gulf or states without defeating them. The

bombing of Al Khobar Towers may have demonstrated American vulnerabilities, but it is far from clear that it provided anyone with strategic benefits. As for proxy wars, it is unclear what terrorist movements are willing to accept such Iranian support and pay the probable political price tag.

Iran and Proliferation

Iran's effort to acquire chemical, biological, and nuclear weapons -- and suitable long-range strike systems – are a serious threat to US interests and regional peace. They also reveal far more important technology transfers from Russia and other states than the transfers in conventional weapons:

DELIVERY SYSTEMS

- Iran has shorter missile range systems:
  - In 1990, Iran bought CSS-8 surface-to-surface missiles (converted SA-2s) from China with ranges of 130-150 kilometers.
  - Has Chinese sea and land-based anti-ship cruise missiles. Iran fired 10 such missiles at Kuwait during Iran-Iraq War, hitting one US-flagged tanker.
- The Soviet-designed Scud B (17E) guided missile currently forms the core of Iran's ballistic missile forces.
  - Iran acquired its Scuds in response to Iraq's invasion. It obtained a limited number from Libya and then obtained larger numbers from North Korea. It deployed these units with a special Khatam ol-Anbya force attached to the air element of the Pasdaran. Iran fired its first Scuds in March, 1985. It fired as many as 14 Scuds in 1985, 8 in 1986, 18 in 1987, and 77 in 1988. Iran fired 77 Scud missiles during a 52 day period in 1988, during what came to be known as the "war of the cites." Sixty-one were fired at Baghdad, nine at Mosul, five at Kirkuk, one at Takrit, and one at Kuwait. Iran fired as many as five missiles on a single day, and once fired three missiles within 30 minutes. This still, however, worked out to an average of only about one missile a day, and Iran was down to only 10-20 Scuds when the war of the cities ended.
  - Iran's missile attacks were initially more effective than Iraq's attacks. This was largely a matter of geography. Many of Iraq's major cities were comparatively close to its border with Iran, but Tehran and most of Iran's major cities that had not already been targets in the war were outside the range of Iraqi Scud attacks. Iran's missiles, in contrast, could hit key Iraqi cities like Baghdad. This advantage ended when Iraq deployed extended range Scuds.
  - The Scud B is a relatively old Soviet design which first became operational in 1967, designated as the R-17E or R-300E. The Scud B has a range of 290-300 kilometers with its normal conventional payload. The export version of the missile is about 11 meters long, 85-90 centimeters in diameter, and weighs 6,300 kilograms. It has a nominal CEP of 1,000 meters. The Russian versions can be equipped with conventional high explosive, fuel air explosive, runway penetrator, submunition, chemical, and nuclear warheads.
  - The export version of the Scud B comes with a conventional high explosive warhead weighing about 1,000 kilograms, of which 800 kilograms are the high explosive payload and 200 are the warhead structure and fusing system. It has a single stage storable liquid rocket engine and is usually deployed on the MAZ-543 eight wheel transporter-erector-launcher (TEL). It has a strap-down inertial guidance, using three gyros to correct its ballistic trajectory, and uses internal graphite jet vane steering. The warhead hits at a velocity above Mach 1.5.
  - Most estimates indicate that Iran now has 6-12 Scud launchers and up to 200 Scud B (R-17E) missiles with 230-310 KM range.
  - Some estimates give higher figures. They estimate Iran bought 200-300 Scud Bs from North Korea between 1987 and 1992, and may have continued to buy such missiles after that time. Israeli experts estimate that Iran had at least 250-300 Scud B missiles, and at least 8-15 launchers on hand in 1997.
  - US experts also believe that Iran can now manufacture virtually all of the Scud B, with the possible exception of the most sophisticated components of its guidance system and rocket motors. This makes it difficult to estimate how many missiles Iran has in inventory and can acquire over time, as well as to estimate the precise performance characteristics of Iran's missiles, since it can alter the weight of the warhead and adjust the burn time and improve the efficiency of the rocket motors

- Iran has new long range North Korean Scuds - with ranges near 500 kilometers.
    - The North Korean missile system is often referred to as a "Scud C." Typically, Iran formally denied the fact it had such systems long after the transfer of these missiles became a reality. Hassan Taherian, an Iranian foreign ministry official, stated in February, 1995, “There is no missile cooperation between Iran and North Korea whatsoever. We deny this.”
    - In fact, a senior North Korean delegation traveled to Tehran to close the deal on November 29, 1990, and met with Mohsen Rezaei, the former commander of the IRGC. Iran either bought the missile then, or placed its order shortly thereafter. North Korea then exported the missile through its Lyongaksan Import Corporation. Iran imported some of these North Korean missile assemblies using its B-747s, and seems to have used ships to import others.
    - Iran probably had more than 60 of the longer range North Korean missiles by 1998, although other sources report 100, and one source reports 170.
    - Iran may have 5-10 Scud C launchers, each with several missiles. This total seems likely to include four new North Korean TELs received in 1995.
    - Iran seems to want enough missiles and launchers to make its missile force highly dispersible.
    - Iran has begun to test its new North Korean missiles. There are reports it has fired them from mobile launchers at a test site near Qom about 310 miles (500 kilometers) to a target area south of Shahroud. There are also reports that units equipped with such missiles have been deployed as part of Iranian exercises like the Saeqer-3 (Thunderbolt 3) exercise in late October, 1993.
    - The missile is more advanced than the Scud B, although many aspects of its performance are unclear. North Korea seems to have completed development of the missile in 1987, after obtaining technical support from the People's Republic of China. While it is often called a “Scud C,” it seems to differ substantially in detail from the original Soviet Scud B. It seems to be based more on the Chinese-made DF-61 than on a direct copy of the Soviet weapon.
    - Experts estimate that the North Korean missiles have a range of around 310 miles (500 kilometers), a warhead with a high explosive payload of 700 kilograms, and relatively good accuracy and reliability. While this payload is a bit limited for the effective delivery of chemical agents, Iran might modify the warhead to increase payload at the expense of range and restrict the using of chemical munitions to the most lethal agents such as persistent nerve gas. It might also concentrate its development efforts on arming its Scud C forces with more lethal biological agents. In any case, such missiles are likely to have enough range-payload to give Iran the ability to strike all targets on the southern coast of the Gulf and all of the populated areas in Iraq, although not the West. Iran could also reach targets in part of eastern Syria, the eastern third of Turkey, and cover targets in the border area of the former Soviet Union, western Afghanistan, and western Pakistan.
    - Accuracy and reliability remain major uncertainties, as does operational CEP. Much would also depend on the precise level of technology Iran deployed in the warhead. Neither Russia nor the People's Republic of China seem to have transferred the warhead technology for biological and chemical weapons to Iran or Iraq when they sold them the Scud B missile and CSS-8. However, North Korea may have sold Iran such technology as part of the Scud C sale. If it did so, such a technology transfer would save Iran years of development and testing in obtaining highly lethal biological and chemical warheads. In fact, Iran would probably be able to deploy far more effective biological and chemical warheads than Iraq had at the time of the Gulf War.
    - Iran may be working with Syria in such development efforts, although Middle Eastern nations rarely cooperate in such sensitive areas. Iran served as a transshipment point for North Korean missile deliveries during 1992 and 1993. Some of this transshipment took place using the same Iranian B-747s that brought missile parts to Iran. Others moved by sea. For example, a North Korean vessel called the *Des Hung Ho*, bringing missile parts for Syria, docked at Bandar Abbas in May, 1992. Iran then flew these parts to Syria. An Iranian ship coming from North Korea and a second North Korean ship followed, carrying missiles and machine tools for both Syria and Iran. At least 20 of the North Korean missiles have gone to Syria from Iran, and production equipment seems to have been transferred to Iran and to Syrian plants near Hama and Aleppo.
- Iran can now assemble Scud and Scud C missiles using foreign-made components. It may soon be able to make entire missile systems and warhead packages in Iran.
- A US examination of Iran’s dispersal, sheltering, and hardening programs for its anti-ship missiles and other missile systems indicate that Iran has developed effective programs to ensure that they would survive a limited number of air strikes and that Iran had reason to believe that the limited number of preemptive strikes Israel could

conduct against targets in the lower Gulf could not be effective in denying Iran the capability to deploy its missiles.

- Iran is developing an indigenous missile production capability with both solid and liquid fueled missiles.
  - The present scale of Iran's production and assembly efforts is unclear. Iran seems to have a design center, at least two rocket and missile assembly plants, a missile test range and monitoring complex, and a wide range of smaller design and refit facilities.
  - The design center is said to located at the Defense Technology and Science Research Center, which is a branch of Iran's Defense Industry Organization, and located outside Karaj -- near Tehran. This center directs a number of other research efforts. Some experts believe it has support from Russian and Chinese scientists.
  - Iran's largest missile assembly and production plant is said to be a North Korean-built facility near Isfahan, although this plant may use Chinese equipment and technology. There are no confirmations of these reports, but this region is the center of much of Iran's advanced defense industry, including plants for munitions, tank overhaul, and helicopter and fixed wing aircraft maintenance. Some reports say the local industrial complex can produce liquid fuels and missile parts from a local steel mill.
  - A second missile plant is said to be located 175 kilometers east of Tehran, near Semnan. Some sources indicate this plant is Chinese-built and began rocket production as early as 1987. It is supposed to be able to build 600-1,000 Oghab rockets per year, if Iran can import key ingredients for solid fuel motors like ammonium perchlorate. The plant is also supposed to produce the Iran-130.
  - Another facility may exist near Bandar Abbas for the assembly of the Seersucker. China is said to have built this facility in 1987, and is believed to be helping the naval branch of the Guards to modify the Seersucker to extend its range to 400 kilometers. It is possible that China is also helping Iran develop solid fuel rocket motors and produce or assemble missiles like the CS-801 and CS-802. There have, however, been reports that Iran is developing extended range Scuds with the support of Russian experts, and of a missile called the Tondar 68, with a range of 700 kilometers.
  - Still other reports claim that Iran has split its manufacturing facilities into plants near Pairzan, Seman, Shiraz, Maghdad, and Islaker. These reports indicate that the companies involved in building the Scuds are also involved in Iran's production of poison gas and include Defense Industries, Shahid, Bagheri Industrial Group, and Shahid Hemat Industrial Group.
  - Iran's main missile test range is said to be further east, near Shahroud, along the Tehran-Mashhad railway. A telemetry station is supposed to be 350 kilometers to the south at Taba, along the Mashhad-Isfahan road. All of these facilities are reportedly under the control of the Islamic Revolutionary Guards Corps.
  - There were many reports during the late 1980s and early 1990s that Iran had ordered the North Korean No Dong missile, which was planned to have the capability to carry nuclear and biological missile ranges of up to 900 kilometers. This range would allow the missile could reach virtually any target in Gulf, Turkey, and Israel. The status of the No Dong program has since become increasingly uncertain, although North Korea deployed some developmental types at test facilities in 1997.
    - The No-Dong underwent flight tests at ranges of 310 miles (500 kilometers) on May 29, 1993. Some sources indicate that Iranians were present at these tests. Extensive further propulsion tests began in August 1994, and some reports indicate operational training began for test crews in May 1995. Missile storage facilities began to be built in July 1995, and four launch sites were completed in October 1995.
    - The progress of the program has been slow since that time, and may reflect development problems. However, mobile launchers were seen deployed in northeast North Korea on March 24, 1997. According to some reports, a further seven launcher units were seen at a facility about 100 kilometers from Pyongyang.
    - The No-Dong 1 is a single-stage liquid-fueled missile, with a range of up to 1,000 to 1,300 kilometers (810 miles), although longer ranges may be possible with a reduced warhead and maximum burn. There are also indications that there may be a No-Dong 2, using the same rocket motor, but with an improved fuel supply system that allows the fuel to burn for a longer period.
    - The missile is about 15.2 meters long -- four meters longer than the Scud B -- and 1.2 meters in diameter. The warhead is estimated to weigh 770 kilograms (1,200-1,750 pounds) and a warhead manufacturing facility exists near Pyongyang. The No-Dong has an estimated theoretical CEP of 700 meters at maximum range, versus 900 meters for the Scud B, although its practical accuracy could be as wide as 3,000-4,000 meters. It has an estimated terminal velocity of Mach 3.5, versus 2.5 for the Scud B, which presents added problems for tactical missile defense. The missile is be transportable on a

modified copy of the MAZ-543P TEL that has been lengthened with a fifth axle and which is roughly 40 meters long. The added support stand for the vertical launch modes brings the overall length to 60 meters, and some experts questioned whether a unit this big is practical.

- These developments may help explain the background to Iran's new Shahab system:
  - Some US experts believe that Iran tested booster engines in 1997 capable of driving a missile ranges of 1,500 kilometers. Virtually all US experts believe that Iran is rapidly approaching the point where it will be able to manufacture missiles with much longer ranges than the Scud B.
  - Eitan Ben Eliyahu -- the commander of the Israeli Air Force -- reported on April 14, 1997 that Iran had tested a missile capable of reaching Israel. The background briefings to his statement implied that Russia was assisting Iran in developing two missiles -- with ranges of 620 and 780 miles Follow-on intelligence briefings that Israel provided in September, 1997, indicated that Russia was helping Iran develop four missiles. US intelligence reports indicate that China has also been helping Iran with some aspects of these missile efforts.
  - These missiles included the Shahab ("meteor") missiles, with performance similar to those previously identified with Iranian missiles adapted from North Korean designs.
  - The Israeli reports indicated that the Shahab 3 was a liquid-fueled missile with a range of 810 miles (1,200-1,500 kilometers) and a payload of 1550 pounds (700 kilometers).
  - Israel claimed the Shahab might be ready for deployment as early as 1999**.**
    - Iran tested the Shahab 3 on July, 21 1998, claiming that it was a defensive action to deal with potential threats from Israel.
      - The missile flew for a distance of up to 620 miles, before it exploded about 100 seconds after launch. US intelligence sources could not confirm whether the explosion was deliberate, but indicated that the final system might have a range of 800-940 miles (a maximum of 1,240 kilometers), depending on its payload. The test confirmed the fact the missile was a liquid fueled system.
      - Gen. Mohammad Bagher Qalibaf, head of the Islamic Revolutionary Guards Corps' air wing publicly reported on August 2, 1998 that the Shahab-3 is 53-foot-long ballistic missile that can travel at 4,300 mph and carry a one-ton warhead at an altitude of nearly 82,000 feet. He claimed that the weapon was guided by an Iranian-made system that gives it great accuracy: "The final test of every weapon is in a real war situation but, given its warhead and size, the Shahab-3 is a very accurate weapon."
      - Other Iranian sources reported that the missile had a range of 800 miles. President Mohammad Khatami on August 1, 1998 stated that Iran was determined to continue to strengthen its armed forces, regardless of international concerns: "Iran will not seek permission from anyone for strengthening its defense capability."
      - Martin Indyck, the US Assistant Secretary for Near East Affairs testified on July 28, that the US estimated that the system needed further refinement but might be deployed in its initial operational form between September, 1998 and March, 1999.
      - Iran publicly displayed the Shahab 3 on its launcher during a parade on September 25, 1998. The missile carrier bore signs saying, "The US can do nothing" and "Israel would be wiped from the map."
      - There are some reports of a Shahab-3B missile with extended range and a larger booster.
      - The resulting system seems to be close to both the No-Dong and Pakistani Ghauri or Haff-5 missile, first tested in April 1998, raising questions about Iranian-North Korean-Pakistani cooperation.
      - North Korean parades exhibiting the Tapeo Dong in September 1999 exhibited a missile with rocket motor and nozzle characteristics similar to those of the Sahab 3.
      - The Shahab 3 was tested in a launch from a transporter-erector-launcher (TEL) from a new air base of the Islamic Revolutionary Guards at Mashad on February 20, 2000, and successfully demonstrated the integration of the engine and missile subsystems. It tested the system again in July 2000, with a nominal range of 810 miles.[xviii]

- Iran tested a solid state missile it called the Shahab D on September 20, 2000. The Iranian Deputy Defense Minister, Vice admiral Ali Shamkani, claimed that it was part of a peaceful program for launching satellites. [xix]

- Iranian sources indicate that the missile has a inertial navigation system with a CEP of 3 kilometers, making it so inaccurate that it can only be lethal against area targets using a weapon of mass destruction.

- Jane's Defense Weekly claimed on March 22, 2000 that US and Israeli intelligence officials felt the Shahab 3 was now ready for deployment.

- Iran announced on July 15, 2000 that it had successfully test-fired an upgraded version of its medium-range Shahab missile. An Iranian defence ministry source was quoted by state media as saying that the missile was test-fired to ensure it conforms to the latest technological standards. It was first tested in 1998. ``This missile is part of our program for the defence industry and it would in no way threaten other countries." Iran announced that the Shahab-3 is a ballistic missile, with a range of 800 miles, and could travel at a speed of 4,320 mph with a 1-ton warhead.

- Iran's Defence Minister Admiral Ali Shamkhani has said a larger missile, Shahab 4, was in production as a vehicle for launching satellites into space.[xx]

- US experts indicated that they estimated the missile had a range of 1,300 km (800 miles), making it capable of hitting Israel, and that the Shahab-3 was modeled mainly on North Korea's Nodong-1, but has been improved with Russian technology. The the US intelligence community is divided whether Iran will sustain its current programs, and actually deploy a system capable of striking the US. US experts indicated that they estimated the missile had a range of 1,300 km (800 miles), making it capable of hitting Israel, and that the Shahab-3 was modeled mainly on North Korea's Nodong-1, but has been improved with Russian technology.[xxi]

- Secretary of Defense William Cohen stated that, [xxii] ``This does not come as a surprise…I have pointed to Iran and the testing of the Shahab-3 and what I assume will be the testing of the 4 in the future and beyond that, as one of the reasons why it is important for the United States to undertake to research, develop and potentially deploy an NMD (national missile defense) system that would provide protection against countries such as Iran posing a threat to the United States…This represents a continuation of their testing program, whether it was scheduled to coincide with the discussions in Washington is a matter only the Iranians can determine, we don't have any information pertaining to that.,. We accept it for what it is, we know that they will continue to test it, they will continue to develop a longer-range missile capability and that is one of the reasons why we believe it is important that the United States continue its research and testing and the development program for the NMD, precisely to deal with countries such as North Korea, Iran, Iraq and others. Anytime you have success in a particular missile system, that gives you confidence to move forward with more tests, with greater capability…So I think there is obviously a potential to accelerate development with each successful test…we have discussed this in the past, we believe that North Korea, Iran, potentially Iraq in the future and others will develop long-range missile capability. This is what we anticipate, this confirms our anticipation, and so this is a factor that will have to be taken into account in terms of what the time frame will be when Iran will have the capability of striking U.S. territory or that of European nations….Only the president can decide whether we should go forward at this point," Cohen said. ``But I think this is an issue that is not going to go away with the elections, and if there is any delay in the program, that another president will have to face it at some point because the threat will continue to expand. "

- Israeli expressed its own concerns. Amos Yaron, director-general of the Defence Ministry, told Israel Radio that, "We are looking at this matter for the moment with some concern because in any event they have the ability. We don't believe they have any intention whatsoever to attack the state of Israel for the moment… It must be remembered that Iran developed these capabilities as a result of the lessons they had from the wars of the past, which is to say from its big war against Iraq. Iran didn't develop this missile against the state of Israel…Now the Iranians have this ability. Between the ability and the intention, there is a great distance." A senior Israeli military source did predict, however, that by 2005, Iran would, with Russian help, achieve a military nuclear capability by 2005 with Russian help. Israel's army chief, Lieutenant-General Shaul Mofaz, told Israel Radio that the combined development of the missile and a non-conventional capacity posed a threat not only to Israel, but also to any country within range of the missile.[xxiii]

- In spite of these developments, a number of US intelligence officials feel the NIC report was politicized by pressure from the policy level to support the NMD program, and to not disagree with

the results of the Rumsfeld Commission,. They feel that Iran still faces problems in in its program to build the Shahab-3, which some feel is a missile with a range of only 780 miles. At least one official has been quoted on backround as stating that, "There is an Iranian threat to U.S. forces in the region, not to the continental United States."

- US officials agree that Iran is considering developing a rocket that can put satellites in orbit, but note that that the development of such a booster would give Iran significantly enhanced capabilities to develop an intercontinental ballistic missile.[xxiv] U.S. Defence Department spokesman Ken Bacon stated that,. "From everything we can tell, it was a successful firing. It is another sign they are determined to build longer-range weapons of mass destruction."[xxv]
- In short, it is impossible to dismiss the possibility that Iran might continue to develop nuclear weapons and long-range missiles in spite of its agreements not to do so. At the same time, there is no way to predict that Iran will definitely pose such a threat, or the size, timing, and effectiveness, of any forces it may deploy. The justification for an NMD system can be built around the *possibility* of an Iranian threat but – as is the case with North Korea – there is no way that the justification for an NMD system can be based on the *certainty* of an Iranian missile threat or that the US can now tailor the architecture of its NMD system to a clear concept of what that threat will be. There equally is no way that the need for an NMD system can be dismissed because of the lack of a valid potential threat.
- It is still unclear when Iran will be able to bring such programs to the final development stage, carry out a full range of suitable test firings, develop highly lethal warheads, and deploy actual units. Much may still depends on the level of foreign assistance.

- In September 1999, the Revolutionary Guard exhibited another missile called the Zelzal, which it stated was "now in mass production." The missile was said to have taken four and one-half years to develop and to be derived from the Zelzal 2, which the IRGC had exhibited earlier. Some estimates indicate that it can carry a warhead of 500 kilograms for up to 900 kilometers. However, the missile exhibited in Tehran was a rocket on a truck-mounted launch rail that seemed more likely to have a range of 150-200 kilometers.
- Iranian Defense Minister Shamkhani has confirmed the development of a "more capable" missile called the Shahab 4. Although he later called it a space booster. He has also mentioned a Shahab 5.
  - Israeli and US intelligence sources have reported that that Iran is developing the Shahab 4, with a range of 2,000 kilometers (1,250 miles), a payload of around 2,000 pounds, and a CEP of around 2,400 meters. Some estimates indicate that this system could be operational in 2-5 years.
  - US Assistant Secretary for Near East Affairs testified on July 28, 1998, that the US estimated that the system still needed added foreign assistance to improve its motors and guidance system.
  - Some reports indicate that the Shahab 4 is based on the Soviet SS-4 missile. Others that there is a longer range Shahab 5, based on the SS-4 or Tapeo Dong missile. Reports saying the Shahab is based on the SS-4 say it has a range of up to 4,000 kilometers and a payload in excess of one ton.)
    - Iran may have two other missile programs include longer-range systems, variously reported as having maximum ranges of 3,650, 4,500-5,000, 6,250, or 10,000 kilometers.
    - There have been reports that Iran might be using Russian technology to develop long-range missiles with ranges from 2,000 to 6,250 kilometers.
    - It seems clear that Iran has obtained some of the technology and design details of the Russian SS-4. The SS-4 (also known as the R-12 or "Sandal") is an aging Russian liquid fuel designed that first went into service in 1959, and which was supposedly destroyed as part of the IRBM Treaty. It is a very large missile, with technology dating back to the early 1950s, although it was evidently updated at least twice during the period between 1959 and 1980. It has a CEP of 2-4 kilometers and a maximum range 2,000 kilometers, which means it can only be lethal with a nuclear warhead or a biological weapon with near-nuclear lethality.
    - At the same time, the SS-4's overall technology is relatively simple and it has a throwweight of nearly 1,400 kilograms (3,000 pounds). It is one of the few missile designs that a nation with a limited technology base could hope to manufacture or adapt, and its throwweight and range would allow Iran to use a relatively unsophisticated nuclear device or biological warhead. As a result, an updated version of the SS-4 might be a suitable design for a developing country.
- Iran is reported to have carried out the test of a sea-launched ballistic missile in 1998.

- Russia has been a key supplier of missile technology.
  - Russia agreed in 1994 that it would adhere to the terms of the Missile Technology Control Regime and would place suitable limits on the sale or transfer of rocket engines and technology. Nevertheless, the CIA has identified Russia as a leading source of Iranian missile technology, and the State Department has indicated that President Clinton expressed US concerns over this cooperation to President Yeltsin. This transfer is one reason the President appointed former Ambassador Frank Wisner, and then Robert Galluci, as his special representatives to try to persuade Russia to put a firm halt to aid support of the Iran.
  - These programs are reported to have continuing support from North Korea, and from Russian and Chinese firms and technicians. One such Chinese firm is Great Wall Industries. The Russian firms include the Russian Central Aerohydrodynamic Institute, which has provided Iran's Shahid Hemmat Industrial Group (SHIG) with wind tunnels for missile design, equipment for manufacturing missile models, and the software for testing launch and reentry performance. They may also include Rosvoorouzhenie, a major Russian arms-export agency; NPO Trud, a rocket motor manufacturer; a leading research center called the Bauman Institute, and Polyus (Northstar), a major laser test and manufacturing equipment firm.
  - Some sources have indicated that Russian military industries have signed contracts with Iran to help produce liquid fueled missiles and provide specialized wind tunnels, manufacture model missiles, and develop specialized computer software. For example, these reports indicate that the Russian Central Aerohydrodynamic Institute is cooperating with Iran's Defense Industries Organization (DIO) and the DIO's Shahid Hemmat Industrial Group (SHIG). The Russian State Corporation for Export and Import or Armament and Military Equipment (Rosvoorouzhenie) and Infor are also reported to be involved in deals with the SHIG. These deals are also said to include specialized laser equipment, mirrors, tungsten-coast graphite material, and maraging steel for missile development and production. They could play a major role in help Iran develop long range versions of the Scud B and C, and more accurate variations of a missile similar to the No Dong.
  - The Israeli press reported in August, 1997 that Israeli had evidence that Iran was receiving Russian support. In September, 1997, Israel urged the US to step up its pressure on Iran, and leaked reported indicating that private and state-owned Russian firms had provided gyroscopes, electronic components, wind tunnels, guidance and propulsion systems, and the components needed to build such systems to Iran.
  - President Yeltsin and the Russian Foreign Ministry initially categorically denied that such charges were true. Following a meeting with Vice President Gore, President Yeltsin stated on September 26, 1997 that, "We are being accused of supplying Iran with nuclear or ballistic missile technologies. There is nothing further from the truth. I again and again categorically deny such rumors."
  - Russia agreed, however, that Ambassador Wisner and Yuri Koptyev, the head of the Russian space program, should jointly examine the US intelligence and draft a report on Russian transfers to Iran. This report reached a very different conclusion from President Yeltsin and concluded that Russia had provided such aid to Iran. Further, on October 1, 1997 -- roughly a week after Yeltsin issued his denial -- the Russian security service issued a statement that it had "thwarted" an Iranian attempt to have parts for liquid fuel rocket motors manufactured in Russia, disguised as gas compressors and pumps.
  - Russian firms said to be helping Iran included the Russian Central Aerohydrodynamic Institute which developed a special wind tunnel; Rosvoorouzhenie, a major Russian arms-export agency; Kutznetzov (formerly NPO Trud) a rocket motor manufacturer in Samara; a leading research center called the Bauman National Technical University in Moscow, involved in developing rocket propulsion systems; the Tsagi Research Institute for rocket propulsion development; and the Polyus (Northstar) Research Institute in Moscow, a major laser test and manufacturing equipment firm. Iranians were also found to be studying rocket engineering at the Baltic State University in St. Petersburg and the Bauman State University.
  - Russia was also found to have sold Iran high strength steel and special foil for its long-range missile program. The Russian Scientific and Production Center Inor concluded an agreement as late as September, 1997 to sell Iran a factory to produce four special metal alloys used in long-range missiles. Inor's director, L. P Chromova worked out a deal with A. Asgharzadeh, the director of an Iranian factory, to sell 620 kilograms of special alloy called 21HKMT, and provide Iran with the capability to thermally treat the alloy for missile bodies. Iran had previously bought 240 kilograms of the alloy. Inor was also selling alloy foils called 49K2F, CUBE2, and 50N in sheets 0.2-0.4 millimeters thick for the outer body of missiles. The alloy 21HKMT was particularly interesting because North Korea also uses it in missile designs. Inor had previously brokered deals with the Shahid Hemat Industrial Group in Iran to supply maraging steel for missile cases, composite graphite-tungsten material, laser equipment, and special mirrors used in missile tests.

- The result was a new and often tense set of conversations between the US and Russia in January, 1998. The US again sent Ambassador Frank Wisner to Moscow, Vice President Gore called Prime Minster Viktor Chernomyrdin, and Secretary of State Madeline Albright made an indirect threat that the Congress might apply sanctions. Sergi Yastrzhembsky, a Kremlin spokesman, initially responded by denying that any transfer of technology had taken place.
- This Russian denial was too categorical to have much credibility. Russia had previously announced the arrest of an Iranian diplomat on November 14, 1997, that it caught attempting to buy missile technology. The Iranian was seeking to buy blueprints and recruit Russian scientists to go to Iran. Yuri Koptev, the head of the Russian Space Agency, explained this, however, by stating that that, "There have been several cases where some Russian organizations, desperately struggling to make ends meet and lacking responsibility, have embarked on some ambiguous projects...they were stopped long before they got to the point where any technology got out."
- The end result of these talks was an agreement by Gore and Chernomyrdin to strengthen controls over transfer technology, but it was scarcely clear that it put an end to the problem. As Koptev has said, "There have been several cases where some Russian organizations, desperately struggling to make ends meet and lacking responsibility, have embarked on some ambiguous projects." Conditions in Russia are getting worse, not better, and the desperation that drives sales has scarcely diminished.
- Prime Minister Chernomyrdin again promised to strengthen his efforts to restrict technology transfer to Iran in a meeting with Gore on March 12, 1998. The US informed Russia of 13 cases of possible Russian aid to Iran at the meeting and offered to increase the number of Russian commercial satellite launches it would license for US firms as an incentive.
- New arrests of smugglers took place on April 9, 1998. The smugglers had attempted to ship 22 tons of specialized steel to Iran via Azerbaijan, using several Russia shell corporations as a cover.
- On April 16, 1998, the State Department declared 20 Russian agencies and research facilities were ineligible to receive US aid because of their role in transferring missile technology to Iran.

- The CIA reported in June 1997 that Iran obtained major new transfers of new long-range missile technology from Russian and Chinese firms during 1996. Since that time, there have been many additional reports of technology transfer from Russia.
- The Rumsfeld Commission heard evidence that Iran had obtained engines or designs for the RD-214 rocket engine used in the SS-4 and SL-7 space launch vehicle.

- Reports on Chinese transfers of ballistic missile technology provide less detail:
  - There have been past reports that Iran placed orders for PRC-made M-9 (CSS-6/DF-15) missile (280-620 kilometers range, launch weight of 6,000 kilograms).
  - It is more likely, however, that PRC firms are giving assistance in developing indigenous missile R&D and production facilities for the production of an Iranian solid fueled missile.
  - The US offered to provide China with added missile technology if it would agree to fully implement an end of technology transfer to Iran and Pakistan during meetings in Beijing on March 25-26, 1998.
- Iran has, however, acquired much of the technology necessary build long-range cruise missile systems from China:
  - Such missiles would cost only 10% to 25% as much as ballistic missiles of similar range, and both the HY-2 Seersucker and CS-802 could be modified relatively quickly for land attacks against area targets.
  - Iran reported in December, 1995 that it had already fired a domestically built anti-ship missile called the Saeqe-4 (Thunderbolt) during exercises in the Strait of Hormuz and Gulf of Oman Other reports indicate that China is helping Iran build copies of the Chinese CS-801/CS-802 and the Chinese FL-2 or F-7 anti-ship cruise missiles. These missiles have relatively limited range. The range of the CS-801 is 8-40 kilometers, the range of the CS-802 is 15-120 kilometers, the maximum range of the F-7 is 30 kilometers, and the maximum range of the FL-10 is 50 kilometers. Even a range of 120 kilometers would barely cover targets in the Southern Gulf from launch points on Iran's Gulf coast. These missiles also have relatively small high explosive warheads. As a result, Iran may well be seeking anti-ship capabilities, rather than platforms for delivering weapons of mass destruction.
  - A platform like the CS-802 might, however, provide enough design data to develop a scaled-up, longer-range cruise missile for other purposes, and the Gulf is a relatively small area where most urban areas and critical

facilities are near the coast. Aircraft or ships could launch cruise missiles with chemical or biological warheads from outside the normal defense perimeter of the Southern Gulf states, and it is at least possible that Iran might modify anti-ship missiles with chemical weapons to attack tankers -- ships which are too large for most regular anti-ship missiles to be highly lethal.

- Building an entire cruise missile would be more difficult. The technology for fusing CBW and cluster warheads would be within Iran's grasp. Navigation systems and jet engines, however, would still be a major potential problem. Current inertial navigation systems (INS) would introduce errors of at least several kilometers at ranges of 1,000 kilometers and would carry a severe risk of total guidance failure -- probably exceeding two-thirds of the missiles fired. A differential global positioning system (GPS) integrated with the inertial navigation system (INS) and a radar altimeter, however, might produce an accuracy of 15 meters. Some existing remotely piloted vehicles (RPVs), such as the South African Skua claim such performance. Commercial technology is becoming available for differential global positioning system (GPS) guidance with accuracies of 2 to 5 meters.
- There are commercially available reciprocating and gas turbine engines that Iran could adapt for use in a cruise missile, although finding a reliable and efficient turbofan engine for a specific design application might be difficult. An extremely efficient engine would have to be matched to a specific airframe. It is doubtful that Iran could design and build such an engine, but there are over 20 other countries with the necessary design and manufacturing skills.
- While airframe-engine-warhead integration and testing would present a challenge and might be beyond Iran's manufacturing skills, it is inherently easier to integrate and test a cruise missile than a long-range ballistic missile. Further, such developments would be far less detectable than developing a ballistic system if the program used coded or low altitude directional telemetry.
- Iran could bypass much of the problems inherent in developing its own cruise missile by modifying the HY-2 Seersucker for use as a land attack weapon and extending its range beyond 80 kilometers, or by modifying and improving the CS-801 (Ying Jai-1) anti-ship missile. There are reports that the Revolutionary Guards are working on such developments at a facility near Bandar Abbas.

- The CIA reported in January 1999 that entities in Russia and China continue to supply missile-related goods and technology to Iran. Tehran is using these goods and technologies to achieve its goal of becoming self-sufficient in the production of MRBMs. The July flight test of the Shahab-3 MRBM demonstrates the success Iran has achieved in realizing that goal. Iran already is producing Scud SRBMs with North Korean help and has begun production of the Shahab-3. In addition, Iran’s Defense Minister has publicly acknowledged the development of the Shahab-4 ballistic missile, with a “longer range and heavier payload than the 1,300-km Shahab-3.”
  - Iran’s earlier success in gaining technology and materials from Russian companies accelerated Iranian development of the Shahab-3 MRBM, which was first flight tested in July 1998.
  - The CIA report on missile proliferation in September 1999 estimated that Iran is the next hostile country most capable of testing an ICBM capable of delivering a weapon to the United States during the next 15 years.
  - Iran *could test* an ICBM that could deliver a several-hundred kilogram payload to many parts of the United States in the latter half of the next decade, using Russian technology and assistance.
  - Iran *could pursue* a Taepo Dong-type ICBM. Most analysts believe it could test a three-stage ICBM patterned after the Taepo Dong-1 SLV or a three-stage Taepo Dong-2-type ICBM, possibly with North Korean assistance, in the next few years.
  - Iran is *likely to test* an SLV by 2010 that—once developed—could be converted into an ICBM capable of delivering a several-hundred kilogram payload to the United States.
  - Analysts differ on the likely timing of Iran’s first flight test of an ICBM that could threaten the United States. Assessments include:
    - *likely* before 2010 and *very likely* before 2015 (noting that an SLV with ICBM capabilities will *probably be tested within the next few years)*;
    - no more than an *even chance* by 2010 and a *better than even chance* by 2015;
    - and less than an even chance by 2015.
- The DCI Nonproliferation Center (NPC) reported in February 2000 that entities in Russia and China continued to supply a considerable amount and a wide variety of ballistic missile-related goods and technology to Iran. Tehran is using these goods and technologies to support current production programs and to achieve its goal of becoming

self-sufficient in the production of ballistic missiles. Iran already is producing Scud short-range ballistic missiles (SRBMs) and has built and publicly displayed prototypes for the Shahab-3 medium-range ballistic missile (MRBM), which had its initial flight test in July 1998 and probably has achieved "emergency operational capability"-i.e., Tehran could deploy a limited number of the Shahab-3 prototype missiles in an operational mode during a perceived crisis situation. In addition, Iran's Defense Minister last year publicly acknowledged the development of the Shahab-4, originally calling it a more capable ballistic missile than the Shahab-3, but later categorizing it as solely a space launch vehicle with no military applications. Iran's Defense Minister also has publicly mentioned plans for a "Shahab 5." It also stated that,

- Firms in China provided missile-related items, raw materials, and/or assistance to several countries of proliferation concern-such as Iran.
- Russian entities continued to supply a variety of ballistic missile-related goods and technical know-how to Iran and were expanding missile-related assistance to Syria and India. For example, Iran's earlier success in gaining technology and materials from Russian companies accelerated Iranian development of the Shahab-3 MRBM, which was first flight-tested in July 1998. Russian entities during the first six months of 1999 have provided substantial missile-related technology, training, and expertise to Iran that almost certainly will continue to accelerate Iranian efforts to build new indigenous ballistic missile systems… the government's commitment, willingness, and ability to curb proliferation-related transfers remain uncertain. Moreover, economic conditions in Russia continued to deteriorate, putting more pressure on Russian entities to circumvent export controls. Despite some examples of restraint, Russian businesses continue to be major suppliers of WMD equipment, materials, and technology to Iran. Monitoring Russian proliferation behavior, therefore, will remain a very high priority.
- Iranian Foreign Ministry spokesman Hamid Reza stated on Febvruary 3, 2000 that Iran had no intention of seeking missiles with the range to reach the US, and that the CIA was only making such charges to distract the world for Israel's nuclear weapons program.
- A CIA report in August 2000 summarized the state of missile proliferation in Iran as follows,[xxvi]
- For the second half of 1999, entities in Russia, North Korea, and China continued to supply the largest amount of ballistic missile-related goods, technology, and expertise to Iran. Tehran is using this assistance to support current production programs and to achieve its goal of becoming self-sufficient in the production of ballistic missiles. Iran already is producing Scud short-range ballistic missiles (SRBMs) and has built and publicly displayed prototypes for the Shahab-3 medium-range ballistic missile (MRBM), which had its initial flight test in July 1998. In addition, Iran's Defense Minister last year publicly acknowledged the development of the Shahab-4, originally calling it a more capable ballistic missile than the Shahab-3, but later categorizing it as solely a space launch vehicle with no military applications. Iran's Defense Minister also has publicly mentioned plans for a "Shahab 5." Such statements, made against the backdrop of sustained cooperation with Russian, North Korean, and Chinese entities, strongly suggest that Tehran intends to develop a longer-range ballistic missile capability in the near future.
- Beginning in January 1998, the Russian Government took a number of steps to increase its oversight of entities involved in dealings with Iran and other states of proliferation concern. In 1999, it pushed a new export control law through the Duma. Russian firms, however, faced economic pressures to circumvent these controls and did so in some cases. The Russian Government, moreover, failed in some cases regarding Iran to enforce its export controls. Following repeated warnings, the US Government in January 1998 and January 1999 imposed administrative measures against Russian entities that had engaged in nuclear- and missile-related cooperation with Iran. The measures imposed on these and other Russian entities (which were penalized in 1998) remain in effect, although sanctions against two entities—Polyus and Inor—are being lifted.
- On the ACW side, Iran (which has acknowledged a need for Western military equipment and spare parts) continues to acquire Western equipment, such as attack helicopters, but also is developing indigenous production capabilities with assistance from countries such as Russia, China, and North Korea. Indigenous efforts involve such systems as tanks, TOW missiles, fighter aircraft, Chinese-designed SAMs and anti-ship missiles, and attack helicopters.
- …Russian entities (have) continued to supply a variety of ballistic missile-related goods and technical know-how to countries such as Iran, India, and Libya. Iran's earlier success in gaining technology and materials from Russian entities accelerated Iranian development of the Shahab-3 MRBM, which was first flight-tested in July 1998. Russian entities during the second six months of 1999 have provided substantial missile-related technology, training, and expertise to Iran that almost certainly will continue to accelerate Iranian efforts to develop new ballistic missile systems.
- Throughout the second half of 1999, North Korea continued to export significant ballistic missile-related equipment and missile components, materials, and technical expertise to countries in the Middle East, South Asia, and North Africa. P'yongyang attaches a high priority to the development and sale of ballistic missiles, equipment,

and related technology. Exports of ballistic missiles and related technology are one of the North's major sources of hard currency, which fuel continued missile development and production.

- …Chinese missile-related technical assistance to Pakistan increased during this reporting period. In addition, firms in China provided missile-related items, raw materials, and/or assistance to several countries of proliferation concern—such as Iran, North Korea, and Libya.…China's 1997 pledge not to engage in any new nuclear cooperation with Iran has apparently held, but work associated with two remaining nuclear projects—a small research reactor and a zirconium production facility—continues. The Intelligence Community will continue to monitor carefully Chinese nuclear cooperation with Iran.

CHEMICAL WEAPONS

- Iran purchased large amounts of chemical defense gear from the mid-1980s onwards. Iran also obtained stocks of non-lethal CS gas, although it quickly found such agents had very limited military impact since they could only be used effectively in closed areas or very small open areas.
- Acquiring poisonous chemical agents was more difficult. Iran did not have any internal capacity to manufacture poisonous chemical agents when Iraq first launched its attacks with such weapons. While Iran seems to have made limited use of chemical mortar and artillery rounds as early as 1985 -- and possibly as early as 1984 -- these rounds were almost certainly captured from Iraq.
- Iran had to covertly import the necessary equipment and supplies, and it took several years to get substantial amounts of production equipment, and the necessary feedstocks. Iran sought aid from European firms like Lurgi to produce large "pesticide" plants, and began to try to obtain the needed feedstock from a wide range of sources, relying heavily on its Embassy in Bonn to manage the necessary deals. While Lurgi did not provide the pesticide plant Iran sought, Iran did obtain substantial support from other European firms and feedstocks from many other Western sources.
- By 1986-1987, Iran developed the capability to produce enough lethal agents to load its own weapons. The Director of the CIA, and informed observers in the Gulf, made it clear that Iran could produce blood agents like hydrogen cyanide, phosgene gas, and/or chlorine gas. Iran was also able to weaponize limited quantities of blister (sulfur mustard) and blood (cyanide) agents beginning in 1987, and had some capability to weaponize phosgene gas, and/or chlorine gas. These chemical agents were produced in small batches, and evidently under laboratory scale conditions, which enabled Iran to load small numbers of weapons before any of its new major production plants went into full operation.
- These gas agents were loaded into bombs and artillery shells, and were used sporadically against Iraq in 1987 and 1988.
- Reports regarding Iran's production and research facilities are highly uncertain:
- Iran seems to have completed completion of a major poison gas plant at Qazvin, about 150 kilometers west of Tehran. This plant is reported to have been completed between November, 1987 and January, 1988. While supposedly a pesticide plant, the facility's true purpose seems to have been poison gas production using organophosphorous compounds.
- It is impossible to trace all the sources of the major components and technology Iran used in its chemical weapons program during this period. Mujahideen sources claim Iran also set up a chemical bomb and warhead plant operated by the Zakaria Al-Razi chemical company near Mahshar in southern Iran, but it is unclear whether these reports are true.
- Reports that Iran had chemical weapons plants at Damghan and Parchin that began operation as early as March, 1988, and may have begun to test fire Scuds with chemical warheads as early as 1988-1989, are equally uncertain.
- Iran established at least one large research and development center under the control of the Engineering Research Centre of the Construction Crusade (Jahad e-Sazandegi), had established a significant chemical weapons production capability by mid-1989,
- Debates took place in the Iranian parliament or Majlis in late 1988 over the safety of Pasdaran gas plants located near Iranian towns, and that Rafsanjani described chemical weapons as follows: "Chemical and biological weapons are poor man's atomic bombs and can easily be produced. We should at least consider them for our defense. Although the use of such weapons is inhuman, the war taught us that international laws are only scraps of paper."
- Post Iran-Iraq War estimates of Iran chemical weapons production are extremely uncertain:

- US experts believe Iran was beginning to produce significant mustard gas and nerve gas by the time of the August, 1988 cease-fire in the Iran-Iraq War, although its use of chemical weapons remained limited and had little impact on the fighting
- Iran's efforts to equip plants to produce V-agent nerve gases seem to have been delayed by US, British, and German efforts to limit technology transfers to Iran, but Iran may have acquired the capability to produce persistent nerve gas during the mid 1990s.
- Production of nerve gas weapons started no later than 1994.
- Began to stockpile of cyanide (cyanogen chloride), phosgene, and mustard gas weapons after 1985. Recent CIA testimony indicates that production capacity may approach 1,000 tons annually.
- Weapons include bombs and artillery. Shells include 155 mm artillery and mortar rounds. Iran also has chemical bombs and mines. It may have developmental chemical warheads for its Scuds, and may have a chemical package for its 22006 RPV (doubtful).
- There are reports that Iran has deployed chemical weapons on some of its ships.
- Iran has increased chemical defensive and offensive warfare training since 1993.
- Iran is seeking to buy more advanced chemical defense equipment, and has sought to buy specialized equipment on world market to develop indigenous capability to produce advanced feedstocks for nerve weapons.
- CIA sources indicated in late 1996, that China might have supplied Iran with up to 400 tons of chemicals for the production of nerve gas.
- One report indicated in 1996, that Iran obtained 400 metric tons of chemical for use in nerve gas weapons from China -- including carbon sulfide.
- Another report indicated that China supplied Iran with roughly two tons of calcium-hypochlorate in 1996, and loaded another 40,000 barrels in January or February of 1997. Calcium-hypochlorate is used for decontamination in chemical warfare.
- Iran placed several significant orders from China that were not delivered. Razak Industries in Tehran, and Chemical and Pharmaceutical Industries in Tabriz ordered 49 metric tons of alkyl dimethylamine, a chemical used in making detergents, and 17 tons of sodium sulfide, a chemical used in making mustard gas. The orders were never delivered, but they were brokered by Iran's International Movalled Industries Corporation (Imaco) and China's North Chemical Industries Co. (Nocinco). Both brokers have been linked to other transactions affecting Iran's chemical weapons program since early 1995, and Nocinco has supplied Iran with several hundred tons of carbon disulfide, a chemical uses in nerve gas.
- Another Chinese firm, only publicly identified as Q. Chen, seems to have supplied glass vessels for chemical weapons.
- The US imposed sanctions on seven Chinese firms in May, 1997, for selling precursors for nerve gas and equipment for making nerve gas -- although the US made it clear that it had, "no evidence that the Chinese government was involved." The Chinese firms were the Nanjing Chemical Industries Group and Jiangsu Yongli Chemical Engineering and Import/Export Corporation. Cheong Yee Ltd., a Hong Kong firm, was also involved. The precursors included tionyl chloride, dimethylamine, and ethylene chlorohydril. The equipment included special glass lined vessels, and Nanjing Chemical and Industrial Group completed construction of a production plant to manufacture such vessels in Iran in June, 1997.
- Iran sought to obtain impregnated Alumina, which is used to make phosphorous-oxychloride -- a major component of VX and GB -- from the US.
- It has obtained some equipment from Israelis. Nahum Manbar, an Israeli national living in France, was convicted in an Israeli court in May 1997 for providing Iran with $16 million worth of production equipment for mustard and nerve gas during the period from 1990 to 1995.
- CIA reported in June 1997 that Iran had obtained new chemical weapons equipment technology from China and India in 1996.
- India is assisting in the construction of a major new plant at Qazvim, near Tehran, to manufacture phosphorous pentasulfide, a major precursor for nerve gas. The plant is fronted by Meli Agrochemicals, and the program was negotiated by Dr. Mejid Tehrani Abbaspour, a chief security advisor to Rafsanjani.

- A recent report by German intelligence indicates that Iran has made major efforts to acquire the equipment necessary to produce Sarin and Tabun, using the same cover of purchasing equipment for pesticide plants that Iraq used for its Sa'ad 16 plant in the 1980s. German sources note that three Indian companies -- Tata Consulting Engineering, Transpek, and Rallis India -- have approached German pharmaceutical and engineering concerns for such equipment and technology under conditions where German intelligence was able to trace the end user to Iran
- Iran ratified the Chemical Weapons Convention in June 1997.
- It submitted a statement in Farsi to the CWC secretariat in 1998, but this consisted only of questions in Farsi as to the nature of the required compliance.
- It has not provided the CWC with any data on its chemical weapons program.
- The CIA estimated in January 1999 that Iran obtained material related to chemical warfare (CW) from various sources during the first half of 1998. It already has manufactured and stockpiled chemical weapons, including blister, blood, and choking agents and the bombs and artillery shells for delivering them. However, Tehran is seeking foreign equipment and expertise to create a more advanced and self-sufficient CW infrastructure.
- The CIA stated that Chinese entities sought to supply Iran with CW-related chemicals during 1997-1998 period. The US sanctions imposed in May 1997 on seven Chinese entities for knowingly and materially contributing to Iran's CW program remain in effect.
- The DCI Nonproliferation Center (NPC) reported in February 2000 that Iran, a Chemical Weapons Convention (CWC) party, already has manufactured and stockpiled chemical weapons, including blister, blood, and choking agents and the bombs and artillery shells for delivering them. During the first half of 1999, Tehran continued to seek production technology, expertise, and chemicals that could be used as precursor agents in its chemical warfare (CW) program from entities in Russia and China. It also acquired or attempted to acquire indirectly through intermediaries in other countries equipment and material that could be used to create a more advanced and self-sufficient CW infrastructure. It also stated that,
- Russian entities remain a significant source of biotechnology and chemicals for Iran. Russia's world-leading expertise in biological and chemical weapons would make it an attractive target for Iranians seeking technical information and training on BW and CW agent production processes.
- Chinese firms had supplied CW-related production equipment and technology to Iran. The US sanctions imposed in May 1997 on seven Chinese entities for knowingly and materially contributing to Iran's CW program remain in effect. In June 1998, China announced that it had expanded its chemical export controls to include 10 of the 20 Australia Group chemicals not listed on the CWC schedules.
- A CIA report in August 2000 summarized the state of chemical weapons proliferation in Iran as follows,[xxvii]
- Iran remains one of the most active countries seeking to acquire WMD and ACW technology from abroad. In doing so, Tehran is attempting to develop an indigenous capability to produce various types of weapons—nuclear, chemical, and biological—and their delivery systems. During the reporting period, the evidence indicates increased reflections of Iranian efforts to acquire WMD- and ACW- related equipment, materials, and technology primarily on entities in Russia, China, North Korea and Western Europe.
- Iran, a Chemical Weapons Convention (CWC) party, already has manufactured and stockpiled chemical weapons, including blister, blood, and choking agents and the bombs and artillery shells for delivering them. During the second half of 1999, Tehran continued to seek production technology, training, expertise, and chemicals that could be used as precursor agents in its chemical warfare (CW) program from entities in Russia and China. It also acquired or attempted to acquire indirectly through intermediaries in other countries equipment and material that could be used to create a more advanced and self-sufficient CW infrastructure.
- Russian entities remain a significant source of biotechnology and chemicals for Iran. Russia's world-leading expertise in biological and chemical weapons would make it an attractive target for Iranians seeking technical information and training on BW and CW agent production processes. Russia (along with its sister republics in the FSU) also remains an important source of conventional weapons and spare parts for Iran, which is seeking to upgrade and replace its existing conventional weapons inventories.
- Throughout the second half of 1999, North Korea continued to export significant ballistic missile-related equipment and missile components, materials, and technical expertise to countries in the Middle East, South Asia, and North Africa. P'yongyang attaches a high priority to the development and sale of ballistic missiles, equipment, and related technology. Exports of ballistic missiles and related technology are one of the North's major sources of hard currency, which fuel continued missile development and production.

- Prior to the the second half of 1999, Chinese firms had supplied CW-related production equipment and technology to Iran. The US sanctions imposed in May 1997 on seven Chinese entities for knowingly and materially contributing to Iran's CW program remain in effect. Evidence during the current reporting period suggests Iran continues to seek such assistance from Chinese entities, but it is unclear to what extent these efforts have succeeded. In June 1998, China announced that it had expanded its chemical export controls to include 10 of the 20 Australia Group chemicals not listed on the CWC schedules.

BIOLOGICAL WEAPONS

- Weapons effort documented as early as 1982. Reports surfaced that Iran had imported suitable type cultures from Europe and was working on the production of Mycotoxins -- a relatively simple family of biological agents that require only limited laboratory facilities for small scale production.
- US intelligence sources reported in August, 1989, that Iran was trying to buy two new strains of fungus from Canada and the Netherlands that can be used to produce Mycotoxins. German sources indicated that Iran had successfully purchased such cultures several years earlier.
- The Imam Reza Medical Center at Mashhad Medical Sciences University and the Iranian Research Organization for Science and Technology were identified as the end users for this purchasing effort, but it is likely that the true end user was an Iranian government agency specializing in biological warfare.
- Many experts believe that the Iranian biological weapons effort was placed under the control of the Islamic Revolutionary Guards Corps, which is known to have tried to purchase suitable production equipment for such weapons.
- Since the Iran-Iraq War, Iran has conducted research on more lethal active agents like Anthrax, hoof and mouth disease, and biotoxins. In addition, Iranian groups have repeatedly approached various European firms for the equipment and technology necessary to work with these diseases and toxins.
    - Unclassified sources of uncertain reliability have identified a facility at Damghan as working on both biological and chemical weapons research and production, and believe that Iran may be producing biological weapons at a pesticide facility near Tehran.
    - Some universities and research centers may be linked to biological weapons program.
    - Reports surfaced in the spring of 1993 that Iran had succeeded in obtaining advanced biological weapons technology in Switzerland and containment equipment and technology from Germany. According to these reports, this led to serious damage to computer facilities in a Swiss biological research facility by unidentified agents. Similar reports indicated that agents had destroyed German bio-containment equipment destined for Iran.
    - More credible reports by US experts indicate that Iran has begun to stockpile anthrax and Botulinum in a facility near Tabriz, can now mass manufacture such agents, and has them in an aerosol form. None of these reports, however, can be verified.
    - The CIA has reported that Iran has, "sought dual-use biotech equipment from Europe and Asia, ostensibly for civilian use." It also reported in 1996 that Iran might be ready to deploy biological weapons. Beyond this point, little unclassified information exists regarding the details of Iran's effort to "weaponize" and produce biological weapons.
- Iran may have the production technology to make dry storable and aerosol weapons. This would allow it to develop suitable missile warheads and bombs and covert devices.
- Iran may have begun active weapons production in 1996, but probably only at limited scale suitable for advanced testing and development.
- CIA testimony indicates that Iran is believed to have weaponized both live agents and toxins for artillery and bombs and may be pursuing biological warheads for its missiles. The CIA reported in 1996 that, "We believe that Iran holds some stocks of biological agents and weapons. Tehran probably has investigated both toxins and live organisms as biological warfare agents. Iran has the technical infrastructure to support a significant biological weapons program with little foreign assistance.
- CIA reported in June 1997 that Iran had obtained new dual use technology from China and India during 1996.
- Iran announced in June 1997 that it would not produce or employ chemical weapons including toxins.
- The CIA estimated in January 1999 that Iran continued to pursue purchasing dual-use biotechnical equipment from Russia and other countries, ostensibly for civilian uses. Its biological warfare (BW) program began during the Iran-Iraq war, and Iran may have some limited capability for BW deployment. Outside assistance is both important and difficult to prevent, given the dual-use nature of the materials and equipment being sought and the many legitimate end uses for these items.
- Russia remains a key source of biotechnology for Iran. Russia's world-leading expertise in biological weapons makes it an attractive target for Iranians seeking technical information and training on BW agent production processes.
- The DCI Nonproliferation Center (NPC) reported in February 2000 that Tehran continued to seek considerable dual-use biotechnical equipment from entities in Russia and Western Europe, ostensibly for civilian uses. Iran began a biological warfare (BW) program during the Iran-Iraq war, and it may have some limited capability for

BW deployment. Outside assistance is both important and difficult to prevent, given the dual-use nature of the materials, the equipment being sought, and the many legitimate end uses for these items.

- A CIA report in August 2000 summarized the state of biological weapons proliferation in Iran as follows,[xxviii]
  - For the reporting period, Tehran expanded its efforts to seek considerable dual-use biotechnical materials, equipment, and expertise from abroad—primarily from entities in Russia and Western Europe—ostensibly for civilian uses. Iran began a biological warfare (BW) program during the Iran-Iraq war, and it may have some limited capability for BW deployment. Outside assistance is both important and difficult to prevent, given the dual-use nature of the materials, the equipment being sought, and the many legitimate end uses for these items.
  - Russian entities remain a significant source of biotechnology and chemicals for Iran. Russia's world-leading expertise in biological and chemical weapons would make it an attractive target for Iranians seeking technical information and training on BW and CW agent production processes. Russia (along with its sister republics in the FSU) also remains an important source of conventional weapons and spare parts for Iran, which is seeking to upgrade and replace its existing conventional weapons inventories.

NUCLEAR WEAPONS

- By the time the Shah fell in January, 1979, he had six reactors under contract, and was attempting to purchase a total of 12 nuclear power plants from Germany, France, and the US. Two 1,300 megawatt German nuclear power plants at Bushehr were already 60% and 75% completed, and site preparation work had begun on the first of two 935 megawatt French plants at Darkhouin that were to be supplied by Framatome.
- The Shah also started a nuclear weapons program in the early to mid-1970s, building upon his major reactor projects, investment in URENCO, and smuggling of nuclear enrichment and weapons related technology from US and Europe.
- 5 megawatt light-water research reactor operating in Tehran.
- 27 kilowatt neutron-source reactor operating in Isfahan.
- Started two massive 1300 megawatt reactor complexes.
- The Shah attempted to covertly import controlled technology from the US/.
- US experts believe that Shah began a low-level nuclear weapons research program, centered at the Amirabad Nuclear Research Center. This research effort included studies of weapons designs and plutonium recovery from spent reactor fuel.
- It also involved a laser enrichment program which began in 1975, and led to a complex and highly illegal effort to obtain laser separation technology from the US. This latter effort, which does not seems to have had any success, continued from 1976 until the Shah's fall, and four lasers operating in the critical 16 micron band were shipped to Iran in October, 1978.
- At the same time, Iran worked on other ways to obtain plutonium, created a secret reprocessing research effort to use enriched uranium, and set up a small nuclear weapons design team.
- In 1976, Iran signed a secret contract to buy $700 million worth of yellow cake from South Africa, and appears to have reached an agreement to buy up to 1,000 metric tons a year. It is unclear how much of this ore South Africa shipped before it agreed to adopt IAEA export restrictions in 1984, and whether South Africa really honored such export restrictions. Some sources indicate that South Africa still made major deliveries as late as 1988-1989.
- Iran also tried to purchase 26.2 kilograms of highly enriched uranium; the application to the US for this purchase was pending when the Shah fell
- The Shah did eventually accept full IAEA safeguards but there value is uncertain .
- In 1984, Khomeini revived nuclear weapons program begun under Shah.
- Received significant West German and Argentine corporate support in some aspects of nuclear technology during the Iran-Iraq War.
- Limited transfers of centrifuge and other weapons related technology from PRC, possibly Pakistan.
- It has a Chinese-supplied heavy-water, zero-power research reactor at Isfahan Nuclear Research Center, and two-Chinese supplied sub-critical assemblies -- a light water and graphite design.
- It has stockpiles of uranium and mines in Yazd area. It may have had a uranium-ore concentration facility at University of Tehran, but status unclear.

- Some experts feel that the IRGC moved experts and equipment from the Amirabad Nuclear Research Center to a new nuclear weapons research facility near Isfahan in the mid-1980s, and formed a new nuclear research center at the University of Isfahan in 1984 -- with French assistance. Unlike many Iranian facilities, the center at Isfahan was not declared to the IAEA until February 1992, when the IAEA was allowed to make a cursory inspection of six sites that various reports had claimed were the location of Iran's nuclear weapons efforts.
- (Bushehr I & II), on the Gulf Coast just southwest of Isfahan, were partially completed at the time of the Shah's fall. Iran attempted to revive the program and sought German and Argentine support, but the reactors were damaged by Iraqi air strikes in 1987 and 1988.
- Iran may also have opened a new uranium ore processing plant close to its Shagand uranium mine in March, 1990, and it seems to have extended its search for uranium ore into three additional areas. Iran may have also begun to exploit stocks of yellow cake that the Shah had obtained from South Africa in the late 1970s while obtaining uranium dioxide from Argentina by purchasing it through Algeria.
- Iran began to show a renewed interest in laser isotope separation (LIS) in the mid-1980s, and held a conference on LIS in September, 1987.
- Iran opened a new nuclear research center in Isfahan in 1984, located about four kilometers outside the city and between the villages of Shahrida and Fulashans. This facility was built at a scale far beyond the needs of peaceful research, and Iran sought French and Pakistani help for a new research reactor for this center.
- The Khomeini government may also have obtained several thousand pounds of uranium dioxide from Argentina by purchasing it through Algeria. Uranium dioxide is considerably more refined than yellow cake, and is easier to use in irradiating material in a reactor to produce plutonium.
- The status of Iran's nuclear program since the Iran-Iraq War is highly controversial, and Iran has denied the existence of such a program.
- On February 7, 1990, the speaker of the Majlis publicly toured the Atomic Energy Organization of Iran and opened the new Jabir Ibn al Hayyan laboratory to train Iranian nuclear technicians. Reports then surfaced that Iran had at least 200 scientists and a work force of about 2,000 devoted to nuclear research
- Iran's Deputy President Ayatollah Mohajerani stated in October, 1991, that Iran should work with other Islamic states to create an "Islamic bomb."
- The Iranian government has repeatedly made proposals to create a nuclear-free zone in the Middle East. For example, President Rafsanjani was asked if Iran had a nuclear weapons program in an interview in the CBS program *60 Minutes* in February 1997. He replied, "Definitely not. I hate this weapon."
- Other senior Iranian leaders, including President Khatami have made similar categorical denials. Iran's new Foreign Minister, Kamal Kharrazi, stated on October 5, 1997, that, "We are certainly not developing an atomic bomb, because we do not believe in nuclear weapons... We believe in and promote the idea of the Middle East as a region free of nuclear weapons and other weapons of mass destruction. But why are we interested to develop nuclear technology? We need to diversify our energy sources. In a matter of a few decades, our oil and gas reserves would be finished and therefore, we need access to other sources of energy...Furthermore, nuclear technology has many other utilities in medicine and agriculture. The case of the United States in terms of oil reserve is not different from Iran's The United States also has large oil resources, but at the same time they have nuclear power plants. So there is nothing wrong with having access to nuclear technology if it is for peaceful purposes..."
- The IAEA reports that Iran has fully complied with its present requirements, and that it has found no indications of nuclear weapons effort, but IAEA only inspects Iran's small research reactors.
- The IAEA visits to other Iranian sites are not inspections, and do not use instruments, cameras, seals, etc. The are informal walk-throughs.
- The IAEA visited five suspect Iranian facilities in 1992 and 1993 in this manner, but did not conduct full inspections.
- Iran has not had any 93+2 inspections and its position on improved inspections is that it will not be either the first or the last to have them.
- Iranian officials have repeatedly complained that the West tolerated Iraqi use of chemical weapons and its nuclear and biological build-up during the Iran-Iraq War, and has a dual standard where it does not demand inspections of Israel or that Israel sign the NPT.
- These are reasons to assume that Iran still has a nuclear program:

- Iran attempted to buy highly enriched fissile material from Khazakstan. The US paid between $20 million and $30 million to buy 1,300 pounds of highly enriched uranium from the Ust-Kamenogorsk facility in Khazakstan that Iran may have sought to acquire in 1992. A total of 120 pounds of the material -- enough for two bombs -- cannot be fully accounted for.
- Iran has imported maraging steel, sometimes used for centrifuges, by smuggling it in through dummy fronts. Britain intercepted 110 pound (50 kilo) shipment in August, 1996. Seems to have centrifuge research program at Sharif University of Technology in Tehran. IAEA “visit” did not confirm.
- Those aspects of Iran's program that are visible indicate that Iran has had only uncertain success. Argentina agreed to train Iranian technicians at its Jose Balaseiro Nuclear Institute, and sold Iran $5.5 million worth of uranium for its small Amirabad Nuclear Research Center reactor in May 1987. A CENA team visited Iran in late 1987 and early 1988, and seems to have discussed selling sell Iran the technology necessary to operate its reactor with 20% enriched uranium as a substitute for the highly enriched core provided by the US, and possibly uranium enrichment and plutonium reprocessing technology as well. Changes in Argentina's government, however, made it much less willing to support proliferation. The Argentine government announced in February, 1992, that it was canceling an $18 million nuclear technology sale to Iran because it had not signed a nuclear safeguards arrangement. Argentine press sources suggested, however, that Argentina was reacting to US pressure.
- In February, 1990 a Spanish paper reported that Associated Enterprises of Spain was negotiating the completion of the two nuclear power plants at Bushehr. Another Spanish firm called ENUSA (National Uranium Enterprises) was to provide the fuel, and Kraftwerke Union (KWU) would be involved. Later reports indicated that a 10 man delegation from Iran's Ministry of Industry was in Madrid negotiating with the Director of Associated Enterprises, Adolofo Garcia Rodriguez.
- Iran negotiated with Kraftwerke Union and CENA of Germany in the late 1980s and early 1990s. Iran attempted to import reactor parts from Siemens in Germany and Skoda in Czechoslovakia. None of these efforts solved Iran’s problems in rebuilding its reactor program, but all demonstrate the depth of its interest.
- Iran took other measures to strengthen its nuclear program during the early 1990s. It installed a cyclotron from Ion Beam Applications in Belgium at a facility in Karzaj in 1991.
- Iran conducted experiments in uranium enrichment and centrifuge technology at its Sharif University of Technology in Tehran. Sharif University was also linked to efforts to import cylinders of fluorine suitable for processing enriched material, and attempts to import specialized magnets that can be used for centrifuges, from Thyssen in Germany in 1991.
- In 1992, Iran attempted to buy beryllium from a storage site in Kazakhstan that also was storing 600 kilograms of highly enriched uranium. These contacts then seem to have expanded to an attempt to try the material, In 1994, they helped lead the US to buy the enriched material and fly it out of the country.
- It is clear from Iran’s imports that it has sought centrifuge technology ever since. Although many of Iran’s efforts have never been made public, British customs officials seized 110 pounds of maraging steel being shipped to Iran in July 1996.
- Iran seems to have conducted research into plutonium separation and Iranians published research on uses of tritium that had applications to nuclear weapons boosting. Iran also obtained a wide range of US and other nuclear literature with applications for weapons designs. Italian inspectors seized eight steam condensers bound for Iran that could be used in a covert reactor program in 1993, and high technology ultrasound equipment suitable for reactor testing at the port of Bari in January, 1994.
- Other aspects of Iran’s nuclear research effort had potential weapons applications. Iran continued to operate an Argentine-fueled five megawatt light water highly enriched uranium reactor at the University of Tehran. It is operated by a Chinese-supplied neutron source research reactor, and subcritical assemblies with 900 grams of highly enriched uranium, at its Isfahan Nuclear Research Center. This Center has experimented with a heavy water zero-power reactor, a light water sub-critical reactor, and a graphite sub-critical reactor. In addition, it may have experimented with some aspects of nuclear weapons design.
- The German Ministry of Economics has circulated a wide list of such Iranian fronts which are known to have imported or attempted to import controlled items. These fronts include the:
    - Bonyad e-Mostazafan;
    - Defense Industries Organization (Sazemane Sanaye Defa);
    - Pars Garma Company, the Sadadja Industrial Group (Sadadja Sanaye Daryaee);

- Iran Telecommunications Industry (Sanaye Mokhaberet Iran);
- Shahid Hemat Industrial Group, the State Purchasing Organization, Education Research Institute (ERI);
- Iran Aircraft Manufacturing Industries (IAI);
- Iran Fair Deal Company, Iran Group of Surveyors;
- Iran Helicopter Support and Renewal Industries (IHI);
- Iran Navy Technical Supply Center;
- Iran Tehran Kohakd Daftar Nezarat, Industrial Development Group;
- Ministry of Defense (Vezerate Defa).

- Iran claims it eventually needs to build enough nuclear reactors to provide 20% of its electric power. This Iranian nuclear power program presents serious problems in terms of proliferation. Although the reactors are scarcely ideal for irradiating material to produce Plutonium or cannibalizing the core, they do provide Iran with the technology base to make its own reactors, have involved other technology transfer helpful to Iran in proliferating and can be used to produce weapons if Iran rejects IAEA safeguards.
  - Russian has agreed to build up to four reactors, beginning with a complex at Bushehr -- with two 1,000-1,200 megawatt reactors and two 465 megawatt reactors, and provide significant nuclear technology.
  - Russia has consistently claimed the light water reactor designs for Bushehr cannot be used to produce weapons grade Plutonium and are similar to the reactors the US is providing to North Korea.
  - The US has claimed, however, that Victor Mikhaliov, the head of Russia's Atomic Energy Ministry, proposed the sale of a centrifuge plant in April, 1995. The US also indicated that it had persuaded Russia not to sell Iran centrifuge technology as part of the reactor deal during the summit meeting between President's Clinton and Yeltsin in May, 1995.
  - It was only after US pressure that Russia publicly stated that it never planned to sell centrifuge and advanced enrichment technology to Iran, and Iran denied that it had ever been interested in such technology. For example, the statement of Mohammed Sadegh Ayatollahi, Iran's representative to the IAEA, stated that, "We've had contracts before for the Bushehr plant in which we agreed that the spent fuel would go back to the supplier. For our contract with the Russians and Chinese, it is the same." According to some reports, Russia was to reprocess the fuel at its Mayak plant near Chelyabinsk in the Urals, and could store it at an existing facility, at Krasnoyarsk-26 in southern Siberia.
  - The CIA reported in June 1997 that Iran had obtained new nuclear technology from Russia during 1996.
  - A nuclear accident at plant at Rasht, six miles north of Gilan, exposed about 50 people to radiation in July, 1996.
  - Russian Nuclear Energy Minister Yevgeny Adamov and Russian Deputy Prime Minister Vladimir Bulgak visited in March, 1998. and Iran and dismissed US complaints about the risk the reactors would be used to proliferate.
    - Russia indicated that it would go ahead with selling two more reactors for construction at Bushehr within the next five years.
  - The first 1,000 megawatt reactor at Bushehr has experienced serious construction delays. In March, 1998, Russia and Iran agreed to turn the construction project into a turn key plant because the Iranian firms working on infrastructure had fallen well behind schedule. In February, Iran had agreed to fund improved safety systems. The reactor is reported to be on a 30- month completion cycle.
  - The US persuaded the Ukraine not to sell Iran $45 million worth of turbines for its nuclear plant in early March, 1998, and to strengthen its controls on Ukrainian missile technology under the MTCR.
- The CIA reported in January 1999 that Russia remained a key supplier for civilian nuclear programs in Iran and, to a lesser extent, India. With respect to Iran's nuclear infrastructure, Russian assistance would enhance Iran's ability to support a nuclear weapons development effort. Such assistance is less likely to significantly advance India's effort, given that India's nuclear weapons program is more mature. By its very nature, even the transfer of civilian technology may be of use in the nuclear weapons programs of these countries.
- Following intense and continuing engagement with the United States, Russian officials have taken some positive steps. Russia has committed to observe certain limits on its nuclear cooperation with Iran, such as not providing militarily useful nuclear technology.

- In January 1998, the Russian Government issued a broad decree prohibiting Russian companies from exporting items known or believed to be used for developing WMD or related delivery systems, whether or not these items are on Russia's export control list. In May 1998, Russia announced a decree intended to strengthen compliance of Russian businesses with existing export controls on proliferation-related items. These actions, if enforced, could help to counter the proliferation of WMD and their delivery systems.
- However, there are signs that Russian entities have continued to engage in behavior inconsistent with these steps. Monitoring Russian proliferation behavior, therefore, will have to remain a very high priority for some time to come.
- On January 14, 2000, Russia's Minister of Defense Igor Ivanavov met with Hassan Rowhani, the secretary of Iran's Supreme National Security Council, and promised that Russia would maintain defense cooperation, and that Russia, "intends to fulfill its obligations under the agrements made in 1989-1990."
- The same day, Vice Minister Ilya Klebanov met with Hassan Rowhani, and announced that Iran might order three additional Russian reactors.
- The CIA warned in January 2000 that Russia might have sold Iran heavy water and graphite technology.
    - China is reported to have agreed to provide significant nuclear technology transfer and possible sale of two 300 megawatt pressurized water reactors in the early 1990s, but then to have agreed to halt nuclear assistance to Iran after pressure from the US.
    - Iran signed an agreement with China's Commission on Science, Technology, and Industry for National Defense on January 21, 1991, to build a small 27-kilowatt research reactor at Iran's nuclear weapons research facility at Isfahan. On November 4, 1991, China stated that it had signed commercial cooperation agreements with Iran in 1989 and 1991, and that it would transfer an electromagnetic isotope separator (Calutron) and a smaller nuclear reactor, for "peaceful and commercial" purposes.
    - The Chinese reactor and Calutron were small research-scale systems and had no direct value in producing fissile material. They did, however, give Iran more knowledge of reactor and enrichment technology, and US experts believe that China provided Iran with additional data on chemical separation, other enrichment technology, the design for facilities to convert uranium to uranium hexaflouride to make reactor fuel, and help in processing yellowcake.
    - The US put intense pressure on China to halt such transfers. President Clinton and Chinese President Jiang Zemin reached an agreement at an October, 1997 summit. China strengthened this pledge in negations with the US in February, 1998.
    - In March, 1998, the US found that the China Nuclear Energy Corporation was negotiating to sell Iran several hundred tons of anhydrous hydrogen fluoride (AHF) to Isfahan Nuclear Research Corporation in central Iran, a site where some experts believe Iran is working on the development of nuclear weapons. AHF can be used to separate plutonium, help refine yellow cake into uranium hexaflouride to produce U-235, and as a feedstock for Sarin. It is on two nuclear control lists. China agreed to halt the sale.
    - Iran denied that China had halted nuclear cooperation on March 15, 1998.
    - Even so, the US acting Under Secretary of State for Arms Control and International Security Affairs stated that China was keeping its pledge not to aid Iran on March 26, 1998.
- The CIA reported in January 1999 that China continued to take steps to strengthen its control over nuclear exports. China promulgated new export control regulations in June 1998 that cover the sale of dual-use nuclear equipment. This follows on the heels of the September 1997 promulgation of controls covering the export of equipment and materials associated exclusively with nuclear applications. These export controls should give the Chinese Government greater accounting and control of the transfer of equipment, materials, and technology to nuclear programs in countries of concern.
- China pledged in late 1997 not to engage in any new nuclear cooperation with Iran and to complete work on two remaining nuclear projects—a small research reactor and a zirconium production facility—in a relatively short period of time. During the first half of 1998, Beijing appears to have implemented this pledge. The Intelligence Community will continue to monitor carefully Chinese nuclear cooperation with Iran.
- During the reporting period, Chinese entities provided a variety of missile-related items and assistance to several countries of proliferation concern. China also was an important supplier of ACW to Iran through the first half of 1998.
- The control of fissile material in the FSU remains a major problem:

- US estimates indicate the FSU left a legacy of some 1,485 tons of nuclear material. This include 770 tons in some 27,000 weapons, including 816 strategic bombs, 5,434 missile warheads, and about 20,000 theater and tactical weapons. In addition, there were 715 tons of fissile or near-fissile material in eight countries of the FSU in over 50 sites: enough to make 35,000-40,000 bombs.
- There are large numbers of experienced FSU technicians, including those at the Russian weapons design center at Arzamas, and at nuclear production complexes at Chelyabinsk, Krasnoyarsk, and Tomsk.
- These factors led the US to conduct Operation Sapphire in 1994, where the US removed 600 kilograms of highly enriched uranium from the Ulba Metallurgy Plant in Kazakhstan at a time Iran was negotiating for the material.
- They also led to Britain and the US cooperating in Auburn Endeavor, and airlifting fissile material out of a nuclear research facility in Tiblisi, Georgia. There were 10 pounds of material at the institute, and 8.8 pounds were HEU. (It takes about 35 pounds to make a bomb.) This operation was reported in the New York Times on April 21, 1998. The British government confirmed it took place, but would not give the date.
- The Jerusalem Post reported on April 9, 1998 that Iran had purchased four tactical nuclear weapons from Russian smugglers for $25 million in the early 1990s, that the weapons had been obtained from Kazakhstan in 1991, and that Argentine technicians were helping to activate the weapon.
- It quoted what it claimed was an Iranian report, dated December 26, 1991, of a meeting between Brigadier General Rahim Safavi, the Deputy Commander of the Revolutionary Guards and Reza Amrohalli, then head of the Iranian atomic energy organization.
- It also quoted a second document -- dated January 2, 1992 --- saying the Iranians were awaiting the arrival of Russian technicians to show them how to disarm the protection systems that would otherwise inactivate the weapons if anyone attempted to use them.
- The documents implied the weapons were flawed by did not indicate whether Iran had succeeded in activating them.
- The US intelligence community denied any evidence that such a transfer had taken place.
- The most detailed reports of Iran’s nuclear weapons program are the least reliable, and come from the People's Mujahideen, a violent, anti-regime, terrorist group. Such claims are very doubtful, but the People’s Mujahideen has reported that:
- Iran’s facilities include a weapons site called Ma'allem Kelayah, near Qazvin on the Caspian. This is said to be an IRGC-run facility established in 1987, which has involved an Iranian investment of $300 million. Supposedly, the site was to house the 10 megawatt reactor Iran tried to buy from India.
- Two Soviet reactors were to be installed at a large site at Gorgan on the Caspian, under the direction of Russian physicists.
- The People's Republic of China provided uranium enrichment equipment and technicians for the site at Darkhouin, where Iran once planned to build a French reactor.
- A nuclear reactor was being constructed at Karaj; and that another nuclear weapons facility exists in the south central part of Iran, near the Iraqi border.
- The ammonia and urea plant that the British firm M. W. Kellog was building at Borujerd in Khorassan province, near the border with Turkestan, might be adapted to produce heavy water.
- The Amir Kabar Technical University, the Atomic Energy Organization of Iran (AEOI) (also known as the Organization for Atomic Energy of Iran or AEOI), Dor Argham Ltd., the Education and Research Institute, GAM Iranian Communications, Ghoods Research Center, Iran Argham Co., Iran Electronic Industries, Iranian Research Organization, Ministry of Sepah, Research and Development Group, Sezemane Sanaye Defa, the Sharif University of Technology, Taradis Iran Computer Company, and Zakaria Al-Razi Chemical Company are all participants in the Iranian nuclear weapons effort.
- Other sources based on opposition data have listed the Atomic Energy Organization of Iran, the Laser Research Center and Ibn-e Heysam Research and Laboratory Complex, the Bonab Atomic Energy Research Center (East Azerbaijan), the Imam Hussein University of the Revolutionary Guards, the Jabit bin al-Hayyan Laboratory, the Khoshomi uranium mine (Yazd), a possible site at Moallem Kalayeh, the Nuclear Research Center at Tehran University, the Nuclear Research Center for Agriculture and Medicine (Karaj), the Nuclear Research Center of Technology (Isfahan), the Saghand Uranium mine (Yazd), the Sharif University (Tehran) and its Physics Research Center.

- The CIA estimated in January 1999 that Iran remains one of the most active countries seeking to acquire WMD technology and ACW. During the reporting period, Iran focused its efforts to acquire WMD-related equipment, materials, and technology primarily on two countries: Russia and China. Iran is seeking to develop an indigenous capability to produce various types of nuclear, chemical, and biological weapons and their delivery systems. It also stated that,

- Russian entities continued to market and support a variety of nuclear-related projects in Iran during the first half of 1998, ranging from the sale of laboratory equipment for nuclear research institutes to the construction of a 1,000-megawatt nuclear power reactor in Bushehr, Iran, that will be subject to International Atomic Energy Agency (IAEA) safeguards. These projects, along with other nuclear-related purchases, will help Iran augment its nuclear technology infrastructure, which in turn would be useful in supporting nuclear weapons research and development.

- Russia has committed to observe certain limits on its nuclear cooperation with Iran. For example, President Yel'tsin has stated publicly that Russia will not provide militarily useful nuclear technology to Iran. Beginning in January this year, the Russian Government has taken a number of steps. For example, in May 1998, Russia announced a decree intended to strengthen compliance of Russian businesses with existing export controls on proliferation-related items.

- China continued to work on one of its two remaining projects—to supply Iran's civil nuclear program with a zirconium production facility. This facility will be used by Iran to produce cladding for reactor fuel. As a party to the Nuclear Nonproliferation Treaty, Iran is required to apply IAEA safeguards to nuclear fuel, but safeguards are not required for the zirconium plant or its products. During the US-China October 1997 Summit, China pledged not to engage in any new nuclear cooperation with Iran and to complete cooperation on two ongoing nuclear projects in a relatively short time. This pledge appears to be holding. In addition, China promulgated new export regulations in June 1998 that cover the sale of dual-use nuclear equipment. The regulations took effect immediately and were intended to strengthen control over equipment and material that would contribute to proliferation. Promulgation of these regulations fulfills Jiang Zemin's commitment to the United States last fall to implement such controls by the middle of 1998.

- Iran claims to desire the establishment of a complete nuclear fuel cycle for its civilian energy program. In that guise, it seeks to obtain whole facilities, such as a uranium conversion facility, that, in fact, could be used in any number of ways in support of efforts to produce fissile material needed for a nuclear weapon. Despite outside efforts to curtail the flow of critical technologies and equipment, Tehran continues to seek fissile material and technology for weapons development and has set up an elaborate system of military and civilian organizations to support its effort.

    - The DCI Nonproliferation Center (NPC) reported in February 2000 that Iran sought nuclear-related equipment, material, and technical expertise from a variety of sources, especially in Russia, during the first half of 1999. Work continues on the construction of a 1,000-megawatt nuclear power reactor in Bushehr, Iran, that will be subject to International Atomic Energy Agency (IAEA) safeguards. In addition, Russian entities continued to interact with Iranian research centers on various activities. These projects will help Iran augment its nuclear technology infrastructure, which in turn would be useful in supporting nuclear weapons research and development. The expertise and technology gained, along with the commercial channels and contacts established-even from cooperation that appears strictly civilian in nature-could be used to advance Iran's nuclear weapons research and developmental program. It also reported that:

    - Russia has committed to observe certain limits on its nuclear cooperation with Iran. For example, President Yel'tsin has stated publicly that Russia will not provide militarily useful nuclear technology to Iran. Beginning in January 1998, the Russian Government took a number of steps to increase its oversight of entities involved in dealings with Iran and other states of proliferation concern. In 1999, it pushed a new export control law through the Duma. Russian firms, however, faced economic pressures to circumvent these controls and did so in some cases. The Russian Government, moreover, failed in some cases regarding Iran to enforce its export controls. Following repeated warnings, the US Government in January 1999 imposed administrative measures against Russian entities that had engaged in nuclear- and missile-related cooperation with Iran. The measures imposed on these and other Russian entities (which were identified in 1998) remain in effect.

    - Following intense and continuing engagement with the US, Russian officials took some positive steps to enhance oversight of Russian entities and their interaction with countries of concern. Russia has reiterated previous commitments to observe certain limits on its nuclear cooperation with Iran, such as not providing militarily useful nuclear technology, although-as indicated above-Russia continues to provide Iran with nuclear technology that could be applied to Iran's weapons program. President Yel'tsin in July 1999 signed a federal export control law, which formally makes WMD-related transfers a violation of law and codifies several existing decrees-including catch-all controls-yet may lessen punishment for violators.

  - China pledged in October 1997 not to engage in any new nuclear cooperation with Iran but said it would complete cooperation on two ongoing nuclear projects, a small research reactor and a zirconium production facility at Esfahan that Iran will use to produce cladding for reactor fuel. The pledge appears to be holding. As a party to the Nuclear Nonproliferation Treaty (NPT), Iran is required to apply IAEA safeguards to nuclear fuel, but safeguards are not required for the zirconium plant or its products.
  - Iran is attempting to establish a complete nuclear fuel cycle for its civilian energy program. In that guise, it seeks to obtain whole facilities, such as a uranium conversion facility, that, in fact, could be used in any number of ways in support of efforts to produce fissile material needed for a nuclear weapon. Despite international efforts to curtail the flow of critical technologies and equipment, Tehran continues to seek fissile material and technology for weapons development and has set up an elaborate system of military and civilian organizations to support its effort.

- The Washington Times reported on June 30, 2000, that a June 8th U.S. intelligence report by the National Security Agency, had stated that stated that Russia is sending tritium gas to a nuclear weapons research center in Tehran.
- The Iranian Ministry of Defense stated on January 18, 2000 that, "The Islamic Republic of Iran, which has taken the initiative to launch a dialogue of civilizations does not need to resort to nuclear weapons…or violence."
- On May 17, 2000, Gholamreza Aghazadeh, the head of Iran's Atomic Energy Organization told the visting Director General of the IAEA, Mohammed Elbaradei, that Iran was seeking IAEA help in running a nuclear research center west of Teheran studying nuclear applications in medicine and agriculture. He again stated that Iran opposed the use of nuclear technology in weapons, and claimed that Iran's nuclear power program had suffered because of US efforts to block technology transfer.
- A CIA report in August 2000 summarized the state of nuclear weapons proliferation in Iran as follows,[xxix]
  - Iran remains one of the most active countries seeking to acquire WMD and ACW technology from abroad. In doing so, Tehran is attempting to develop an indigenous capability to produce various types of weapons—nuclear, chemical, and biological—and their delivery systems. During the reporting period, the evidence indicates increased reflections of Iranian efforts to acquire WMD- and ACW- related equipment, materials, and technology primarily on entities in Russia, China, North Korea and Western Europe.
  - Iran sought nuclear-related equipment, material, and technical expertise from a variety of sources, especially in Russia, during the second half of 1999. Work continues on the construction of a 1,000-megawatt nuclear power reactor in Bushehr, Iran, that will be subject to International Atomic Energy Agency (IAEA) safeguards. In addition, Russian entities continued to interact with Iranian research centers on various activities. These projects will help Iran augment its nuclear technology infrastructure, which in turn would be useful in supporting nuclear weapons research and development. The expertise and technology gained, along with the commercial channels and contacts established—even from cooperation that appears strictly civilian in nature—could be used to advance Iran's nuclear weapons research and developmental program.
  - Beginning in January 1998, the Russian Government took a number of steps to increase its oversight of entities involved in dealings with Iran and other states of proliferation concern. In 1999, it pushed a new export control law through the Duma. Russian firms, however, faced economic pressures to circumvent these controls and did so in some cases. The Russian Government, moreover, failed in some cases regarding Iran to enforce its export controls. Following repeated warnings, the US Government in January 1998 and January 1999 imposed administrative measures against Russian entities that had engaged in nuclear- and missile-related cooperation with Iran. The measures imposed on these and other Russian entities (which were penalized in 1998) remain in effect, although sanctions against two entities—Polyus and Inor—are being lifted.
  - China pledged in October 1997 not to engage in any new nuclear cooperation with Iran but said it would complete cooperation on two ongoing nuclear projects, a small research reactor and a zirconium production facility at Esfahan that Iran will use to produce cladding for reactor fuel. The pledge appears to be holding. As a party to the Nuclear Nonproliferation Treaty (NPT), Iran is required to apply IAEA safeguards to nuclear fuel, but safeguards are not required for the zirconium plant or its products.
  - Iran claims that it is attempting to establish a complete nuclear fuel cycle for its civilian energy program. In that guise, it seeks to obtain whole facilities, such as a uranium conversion facility, that, in fact, could be used in any number of ways in support of efforts to produce fissile material needed for a nuclear weapon. Despite international efforts to curtail the flow of critical technologies and equipment, Tehran continues to seek fissile material and technology for weapons development and has set up an elaborate system of military and civilian organizations to support its effort.

- During the second half of 1999, Russia also remained a key supplier for civilian nuclear programs in Iran, primarily focused on the Bushehr Nuclear Power Plant project. With respect to Iran's nuclear infrastructure, Russian assistance enhances Iran's ability to support a nuclear weapons development effort. By its very nature, even the transfer of civilian technology may be of use in Iran's nuclear weapons program. We remain concerned that Tehran is seeking more than a buildup of its civilian infratructure, and the IC will be closely monitoring the relationship with Moscow for any direct assistance in support of a military program. In addition, Russia supplied India with material for its civilian nuclear program during this reporting period.
- Following intense and continuing engagement with the US, Russian officials took some positive steps to strengthen the legal basis of export controls. President Yel'tsin in July 1999 signed a federal export control law, which formally makes WMD-related transfers a violation of law and codifies several existing decrees—including catch-all controls—yet may lessen punishment for violators. Russian export enforcement and prosecution still remains weak, however. The export law is still awaiting completion of implementing decrees and its legal status is unclear. Public comments by the head of Russia's security council indicate that Russia obtained only three convictions for export control violations involving WMD and missile technology during 1998-99.
- Nonetheless, the Russian government's commitment, willingness, and ability to curb proliferation-related transfers remain uncertain. Moreover, economic conditions in Russia continued to deteriorate, putting more pressure on Russian entities to circumvent export controls. Despite some examples of restraint, Russian businesses continue to be major suppliers of WMD equipment, materials, and technology to Iran. Specifically, Russia continues to provide Iran with nuclear technology that could be applied to Iran's weapons program. Monitoring Russian proliferation behavior, therefore, will remain a very high priority.
- …Chinese missile-related technical assistance to Pakistan increased during this reporting period. In addition, firms in China provided missile-related items, raw materials, and/or assistance to several countries of proliferation concern—such as Iran, North Korea, and Libya.…China's 1997 pledge not to engage in any new nuclear cooperation with Iran has apparently held, but work associated with two remaining nuclear projects—a small research reactor and a zirconium production facility—continues. The Intelligence Community will continue to monitor carefully Chinese nuclear cooperation with Iran.

- US estimates of Iran's progress in acquiring nuclear weapons have changed over time.
  - In 1992, the CIA estimated that Iran would have the bomb by the year 2000. In 1995, John Holum testified that Iran could have the bomb by 2003.
  - In 1997, after two years in which Iran might have made progress, he testified that Iran could have the bomb by 2005-2007.
  - In 1999, the NIE on proliferation estimated that Iran could test a missile that could reach the US by 2010, but did not change the 1997 estimate or when Iran might acquire a bomb.
  - In early 2000, the New York Time reported that the CIA had warned that Iran might now be able to maker a nuclear weapon. The assessment stated that the CIA could not monitor Iran closely enough to be certain whether Iran had acquired fissile material from an outside source.
  - US experts increasingly refer to Iran's efforts as "creeping proliferation" and there is no way to tell when or if Iranian current efforts will produce a weapon, and unclassified lists of potential facilities have little credibility..
  - Timing of weapons acquisition depends heavily on whether Iran can buy fissile material -- if so it has the design capability and can produce weapons in 1-2 years -- or must develop the capability to process Plutonium or enrich Uranium -- in which case, it is likely to be 5-10 years.

Iran's current success in proliferating does give Iran a post-Gulf War edge over Iraq. It also inevitably affects US, British, Israeli and Southern Gulf perceptions of the risks inherent in attacking Iran. However, "weapons of mass destruction" have not yet made radical changes in Iran's contingency capabilities.

Much depends upon any potential opponent's perceptions of the risk in engaging Iran, refusing its demands, and dealing with Iranian escalation and/or retaliation. It seems unlikely that Iran's "creeping proliferation" will reach the point in the near term where Iran's capabilities are great enough to change US, British, Israeli and/or Southern Gulf perceptions of risk to the point where they would limit or paralyze outside military

action. Further, it seems unlikely that Iran can continue to build up its capabilities without provoking even stronger US counter-proliferation programs, including retaliatory strike capabilities. The same is true of a response from Iraq and the Southern Gulf states. As a result, Iran's "creeping proliferation" may end simply in provoking a "creeping arms race."

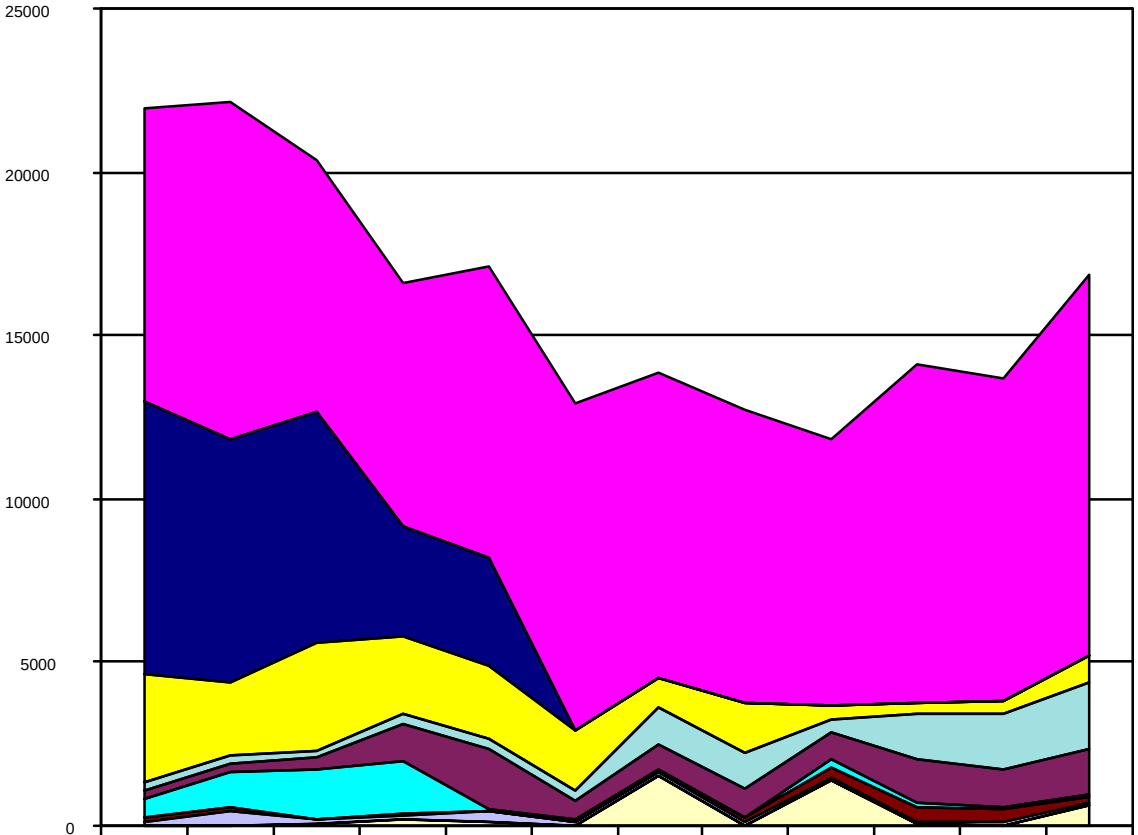
There are, however, at least four contingencies that could challenge US regional influence:

- A successful Iranian attempt to buy significant amounts of weapons grade material that suddenly shifted proliferation from "creeping" to an active and regionally destabilizing threat and potential counter to US conventional capabilities.
- Iranian acquisition of highly lethal biological weapons and/or change in the US and regional perception of biological weapons.
- A case of lateral escalation in which Iraq found a way to end UN sanctions and/or reveal a substantial break-out capability of its own, creating the risk of a new Iran-Iraq War using weapons of mass destruction that could affect two countries with over 15% of the world's oil reserves and which could spillover into other Gulf states.
- Iranian use of such weapons through proxies or in covert attacks where it had some degree of plausible deniability.

Chart Five

Cumulative Arms Imports of the Gulf States - 1984-1997

(Value of Deliveries in Constant $1997 Millions)



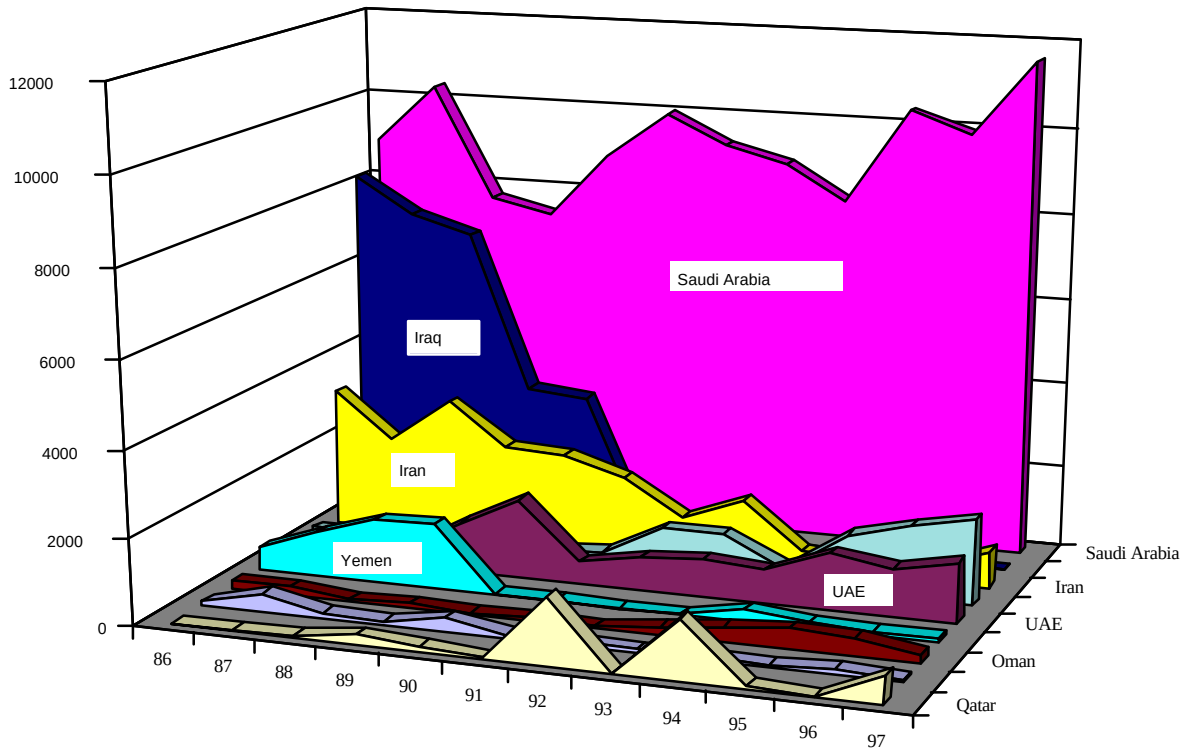
	86	87	88	89	90	91	92	93	94	95	96	97
Saudi Arabia	8978	10320	7710	7423	8900	9968	9312	8962	8143	10350	9862	11600
Iraq	8288	7448	7078	3407	3279	0	0	0	0	0	0	0
Iran	3305	2221	3286	2312	2225	1812	942	1512	412	342	356	850
Kuwait	271	248	152	316	316	374	1109	1080	412	1346	1728	2000
UAE	247	261	404	1187	1874	532	804	891	793	1346	1118	1400
Yemen	564	1045	1523	1554	35	41	6	22	275	145	81	110
Oman	178	157	38	73	12	57	11	140	307	445	376	160
Bahrain	91	418	126	97	328	79	122	86	106	72	132	90
Qatar	7	12	38	219	117	23	1552	11	1375	52	5	625

Source: Adapted by Anthony H. Cordesman from US Arms Control and Disarmament Agency, World Military Expenditures and Arms Transfers, GPO, Washington, various editions.

Chart Six

Comparative Arms Imports of the Gulf States – 1986-1997

(Value of Deliveries in Constant $1997 Millions)



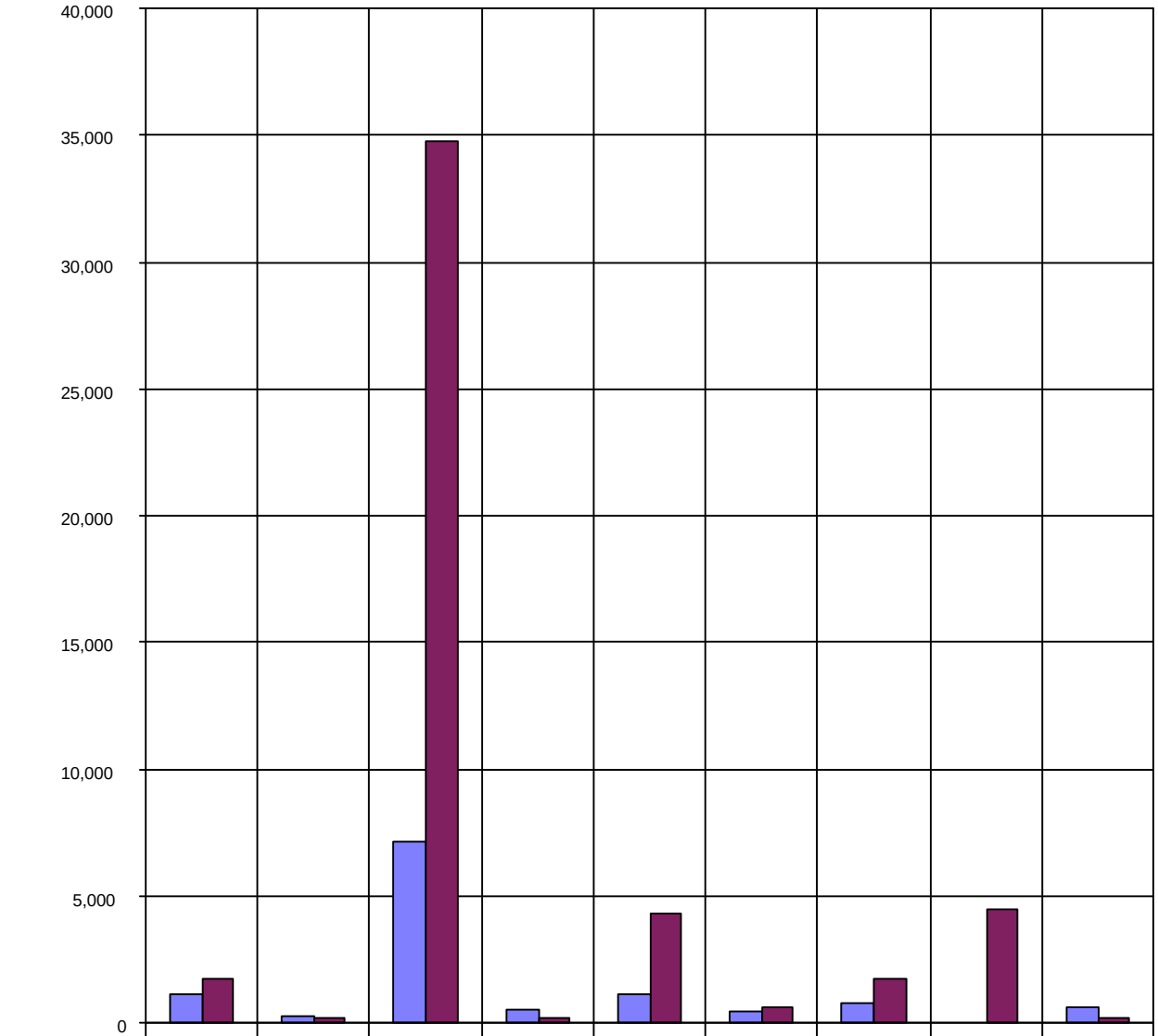
	86	87	88	89	90	91	92	93	94	95	96	97
Qatar	7	12	38	219	117	23	1552	11	1375	52	5	625
Bahrain	91	418	126	97	328	79	122	86	106	72	132	90
Oman	178	157	38	73	12	57	11	140	307	445	376	160
Yemen	564	1045	1523	1554	35	41	6	22	275	145	81	110
UAE	247	261	404	1187	1874	532	804	891	793	1346	1118	1400
Kuwait	271	248	152	316	316	374	1109	1080	412	1346	1728	2000
Iran	3305	2221	3286	2312	2225	1812	942	1512	412	342	356	850
Iraq	8288	7448	7078	3407	3279	0	0	0	0	0	0	0
Saudi Arabia	8978	10320	7710	7423	8900	9968	9312	8962	8143	10350	9862	11600

Source: Adapted by Anthony H. Cordesman from US Arms Control and Disarmament Agency, World Military Expenditures and Arms Transfers, GPO, Washington, various editions.

Chart Seven

Total Gulf New Arms Agreements and Deliveries 1996-1999

($Current US Millions)



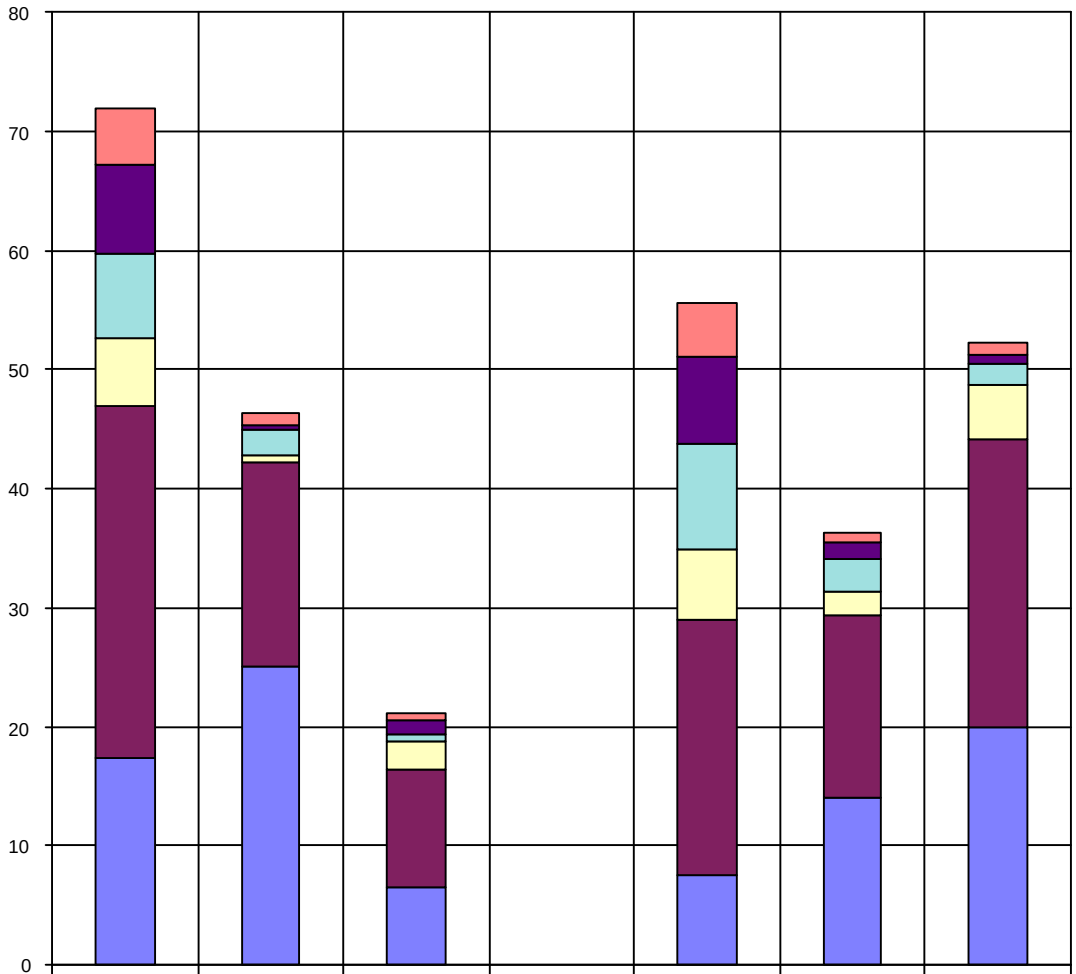
	Iran	Iraq	Saudi Arabia	Bahrain	Kuwait	Oman	Qatar	UAE	Yemen
Agreements	1,100	220	7,100	500	1,100	400	800	7.7	600
Deliveries	1,700	190	34,800	200	4,300	600	1,700	4,500	200

0 = less than $50 million or nil, and all data rounded to the nearest $100 million.
Source: Richard F. Grimmett, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

Chart Eight

Major Supplier Share of Total Gulf Arms Agreements and Deliveries: 1987-1998

($Current US Billions)



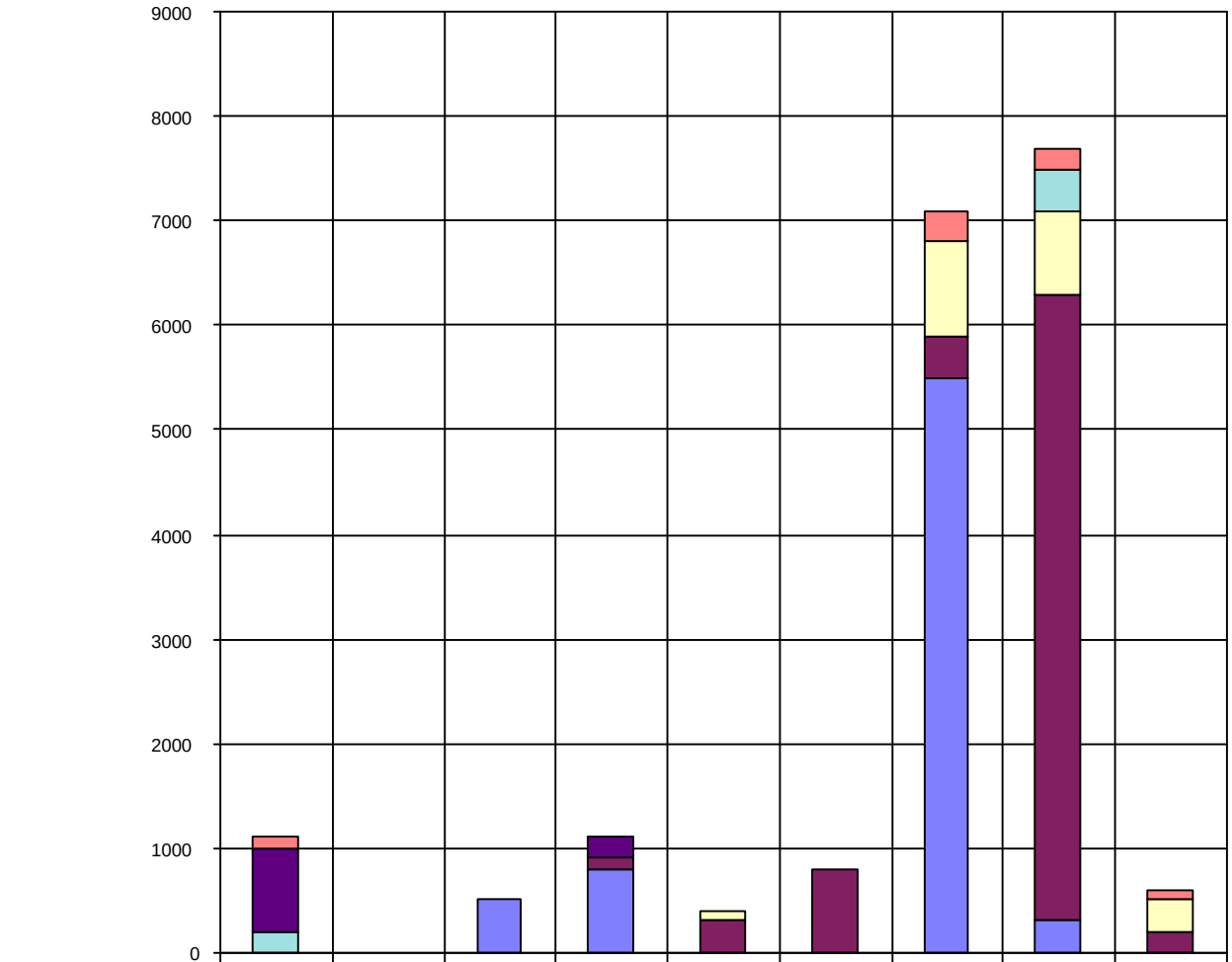
	Agreements: 87-90	Agreements: 91-94	Agreements: 95-98		Deliveries: 87-90	Deliveries: 91-94	Deliveris: 95-98
All Others	4.8	1	0.7		4.6	0.7	1
China	7.5	0.4	1		7.3	1.4	0.8
Russia	7	2.2	0.6		8.8	2.8	1.7
All Other Europe	5.8	0.7	2.4		6	1.9	4.5
Major West Europe	29.5	17	9.8		21.4	15.4	24.3
US	17.4	25.1	6.6		7.5	14	19.9

0 = less than $50 million or nil, and all data rounded to the nearest $100 million.
Source: Richard F. Grimmett, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

Chart Nine

Major Supplier Share of Total Gulf New Arms Agreements: 1996-1999

($Current US Billions)



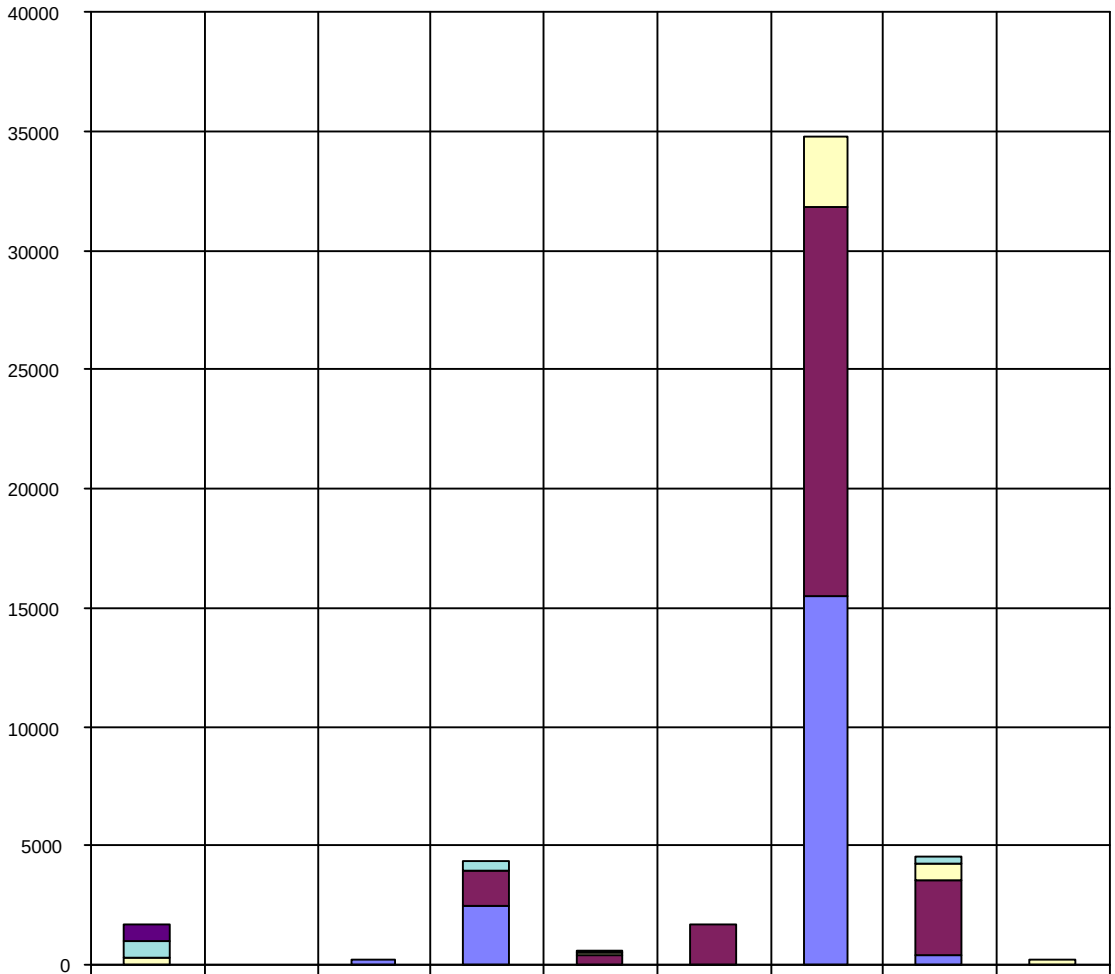
	Iran	Iraq	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	Yemen
All Others	100						300	200	100
China	800			200					
Russia	200							400	
All Other Europe					100		900	800	300
Major West Europe				100	300	800	400	6,000	200
US	0		500	800			5,500	300	
TOTAL	1,100		500	1,100	400	800	7,100	7,700	600

0 = less than $50 million or nil, and all data rounded to the nearest $100 million.
Source: Richard F. Grimmett, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

Chart Ten

Major Supplier Share of Total Gulf New Arms Deliveries: 1996-1999

($Current US Billions)



	Iran	Iraq	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	Yemen
All Others					100				
China	700								
Russia	700			400				300	
All Other Europe	300				100		3,000	700	200
Major West Europe				1,400	400	1,700	16,300	3,100	
US			200	2,500			15,500	400	
TOTAL	1,700		200	4,300	600	1,700	34,800	4,500	200

0 = less than $50 million or nil, and all data rounded to the nearest $100 million.
Source: Richard F. Grimmett, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

[i] Table One, Arms Control and Disarmament Agency (ACDA), World Military Expenditures and Arms Transfers, 1996, Washington, GPO, 1997, and Bureau of Arms Control, US State Department, World Military Expenditures and Arms Transfers, 1998, Washington, GPO, 2000.

[ii] Table One, ACDA, World Military Expenditures and Arms Transfers, 1993-1994, Washington, GPO, 1995; Table One, ACDA, World Military Expenditures and Arms Transfers, 1995, Washington, GPO, 1996; and Table One, Arms Control and Disarmament Agency (ACDA), World Military Expenditures and Arms Transfers, 1996, Washington, GPO, 1997.

[iii] British sources quoted in Jane's Defense Weekly, February 1, 1992, p. 158. The Egyptian Gazette projected expenditures of $5 billion per year in 1992, 1993, and 1994 in its January 29, 1992, issue. The Jaffee Center estimated expenditures of $8.5 billion in 189 and $8.6 billion in 1990. Andrew Duncan of the IISS estimated expenditures of $10 billion annually in 1992, 1993, and 1994 in Defense News, January 27, 1992. The CIA estimate is taken from CIA, World Factbook, 1992, "Iran;" CIA, World Factbook, 1993, "Iran;" CIA, World Factbook, 1994, "Iran;" and CIA, World Factbook, 1995, "Iran." It is extremely difficult to relate any Iranian statistics to dollar figures because Iran uses multiple exchange rates, and often reports inaccurate statistics. See Patrick Clawson, Iran's Challenge to the West, How, When, and Why, Washington, The Washington Institute Policy Papers, Number Thirty Three, 1993. p. 58.

[iv] IISS, Military Balance, various editions.

[v] IISS, Military Balance, 1997-1998, p. 132.Other IISS estimates indicate that Iran's expenditures in constant $1995 US dollars totaled $19.4 million in 1985, $3 billion in 1995, and $3.3 billion in 1996. Middle East Economic Digest, October 24, 1997, p. 16.

[vi] Richard F. Grimmett, Conventional Arms Transfers to the Third World, 1983-1990, Washington, Congressional Research Service, CRS-91-578F, August 2, 1991, p. 53.

[vii] Richard F. Grimmett, Conventional Arms Transfers to the Third World, 1986-1993, Washington, Congressional Research Service, CRS-94-612F, July 29, 1994, p. 57, and Richard F. Grimmett, Conventional Arms Transfers to the Third World, 1987-1995, Washington, Congressional Research Service, CRS-95-862F, August 4, 1995, pp. 57-58, 67-69.

[viii] Richard F. Grimmett, Conventional Arms Transfers to the Third World, 1987-1995, Washington, Congressional Research Service, CRS-95-862F, August 4, 1995, pp. 57-58, 67-69.

[ix] Richard F. Grimmett, Conventional Arms Transfers to the Third World, 1986-1993, Washington, Congressional Research Service, CRS-94-612F, July 29, 1994, p. 57, and Richard F. Grimmett, Conventional Arms Transfers to the Third World, 1987-1995, Washington, Congressional Research Service, CRS-95-862F, August 4, 1995, pp. 57-58, 67-69.

[x] Richard F. Grimmett, Conventional Arms Transfers to the Third World, 1983-1990, Washington, Congressional Research Service, CRS-9 1-578F, August 2, 1991, Conventional Arms Transfers to the Third World, 1984-1991, Washington, Congressional Research Service, CRS-92-577F, July 20, 1991, Conventional Arms Transfers to the Third World, 1987-1994, Washington, Congressional Research Service, CRS-95-862F, August 4, 1995; Conventional Arms Transfers to the Third World, 1988-1956, Washington, Congressional Research Service, CRS-96-667F, August 15, 1996; and , Conventional Arms Transfers to the Third World, 1989-1996, Washington, Congressional Research Service, CRS-97-778F, August 13, 1997. 0 = data less than $50 million or nil. All data are rounded to the nearest $100 million. Major West European includes Britain, France, Germany, and Italy.

[xi] Richard F. Grimmett, Conventional Arms Transfers to the Third World, 1992-1999, Washington, Congressional Research Service, CRS-RL30275, August 18, 2000.

[xii] Richard F. Grimmett, Conventional Arms Transfers to the Third World, 1991-1998, Washington, Congressional Research Service, CRS-9 1-578F, August 2, 1991; and Conventional Arms Transfers to the Third World, 1992-1999, Washington, Congressional Research Service, CRS-RL30275, August 18, 2000. Expenditures less than $50 million are not reported. All data are rounded to the nearest $100 million. Major West European includes Britain, France, Germany, and Italy.

[xiii] Table II in Bureau of Arms Control, US State Department, World Military Expenditures and Arms Transfers, 1998, Washington, GPO, 2000.

[xiv] Richard F. Grimmett, Conventional Arms Transfers to the Third World, 1991-1998, Washington, Congressional Research Service, CRS-9 1-578F, August 2, 1991, Richard F. Grimmett, Conventional Arms Transfers to the Third World, 1991-1998, Washington, Congressional Research Service, CRS-9 1-578F,

August 2, 1991; and Conventional Arms Transfers to the Third World, 1992-1999, Washington, Congressional Research Service, CRS-RL30275, August 18, 2000. Expenditures less than $50 million are not reported. All data are rounded to the nearest $100 million. Major West European includes Britain, France, Germany, and Italy.

[xv] Richard F. Grimmett, Conventional Arms Transfers to the Third World, 1991-1998, Washington, Congressional Research Service, CRS-9 1-578F, August 2, 1991, p. 52; and Conventional Arms Transfers to the Third World, 1992-1999, Washington, Congressional Research Service, CRS-RL30275, August 18, 2000, p. 47.

[xvi] Richard F. Grimmett, Conventional Arms Transfers to the Third World, 1991-1998, Washington, Congressional Research Service, CRS-9 1-578F, August 2, 1991, Richard F. Grimmett, Conventional Arms Transfers to the Third World, 1991-1998, Washington, Congressional Research Service, CRS-9 1-578F, August 2, 1991; and Conventional Arms Transfers to the Third World, 1992-1999, Washington, Congressional Research Service, CRS-RL30275, August 18, 2000. Expenditures less than $50 million are not reported. All data are rounded to the nearest $100 million. Major West European includes Britain, France, Germany, and Italy.

[xvii] Jane's Defense Weekly, June 5, 1996, p. 15.

[xviii] Associated Press, September 21, 2000, 1930; Reuters, September 28, 2000, 1236.

[xix] Associated Press, September 21, 2000, 1930; Reuters, September 28, 2000, 1236.

[xx] Associated Press, July 15, 2000, 0935; Reuters, July 15, 2000, 0714.

[xxi] Associated Press, July 15, 2000, 0935; Reuters, July 15, 2000, 0714.

[xxii] Reuters, July 17, 2000, 1257.

[xxiii] Reuters, July 15, 2000, 2158.

[xxiv] Elaine Sciolino and Steven Lee Myers, "U.S. Study Reopens Division Over Nuclear Missile Threat," New York Times, July 4, 2000.

[xxv] July 16, 2000, 0826.

[xxvi] CIA, August 10, 2000, Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, 1 July Through 31 December 1999 internet edition.

[xxvii] CIA, August 10, 2000, Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, 1 July Through 31 December 1999 internet edition.

[xxviii] CIA, August 10, 2000, Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, 1 July Through 31 December 1999 internet edition.

[xxix] CIA, August 10, 2000, Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, 1 July Through 31 December 1999 internet edition.