

1800 K Street, NW
Suite 400
Washington, DC 20006

Phone: 1.202.775.3270
Fax: 1.202.775.3199

Web:
www.csis.org/burke/reports



Iran Status Report

Iran and the Challenges to US Policy

Anthony H. Cordesman
Arleigh A. Burke Chair in Strategy
and **Adam C. Seitz**

CSIS

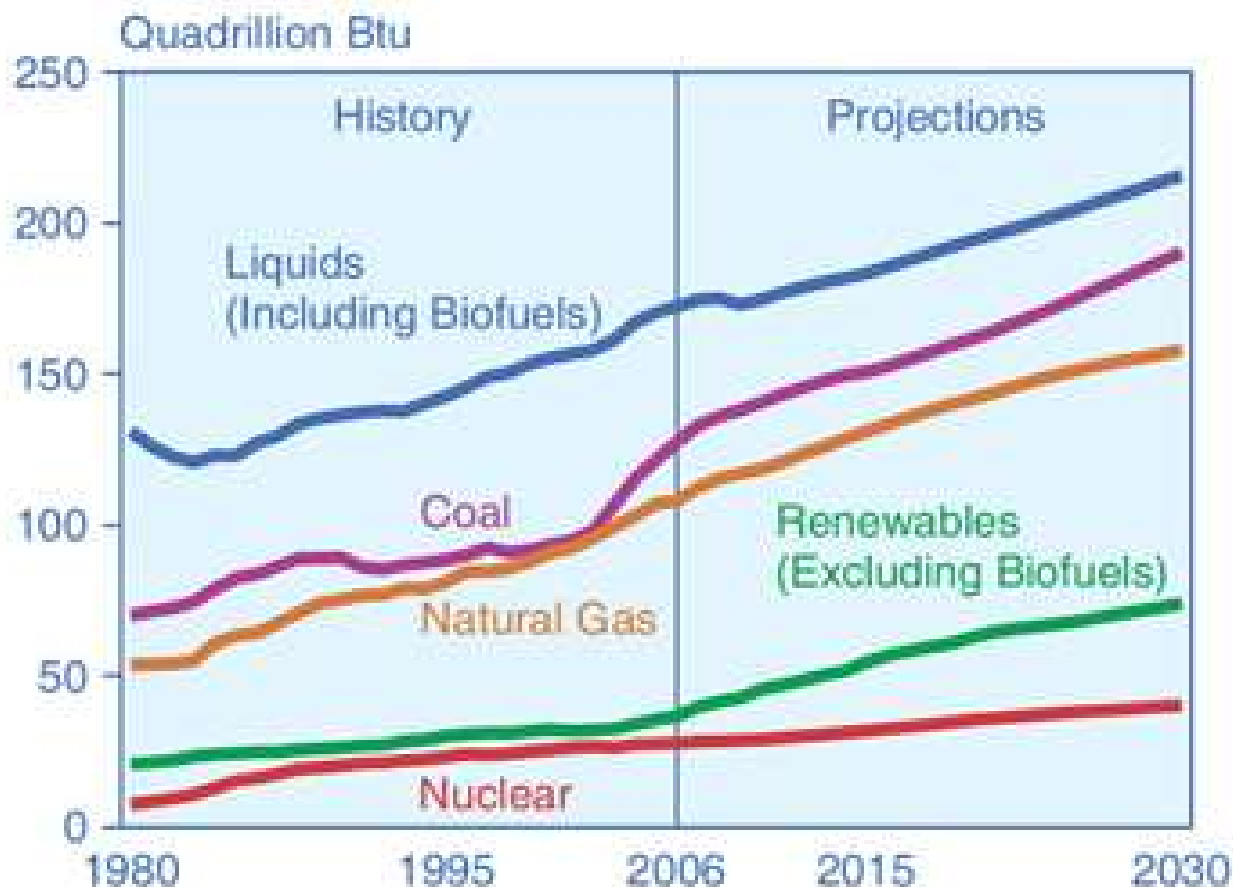
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in Strategy

August 11, 2009

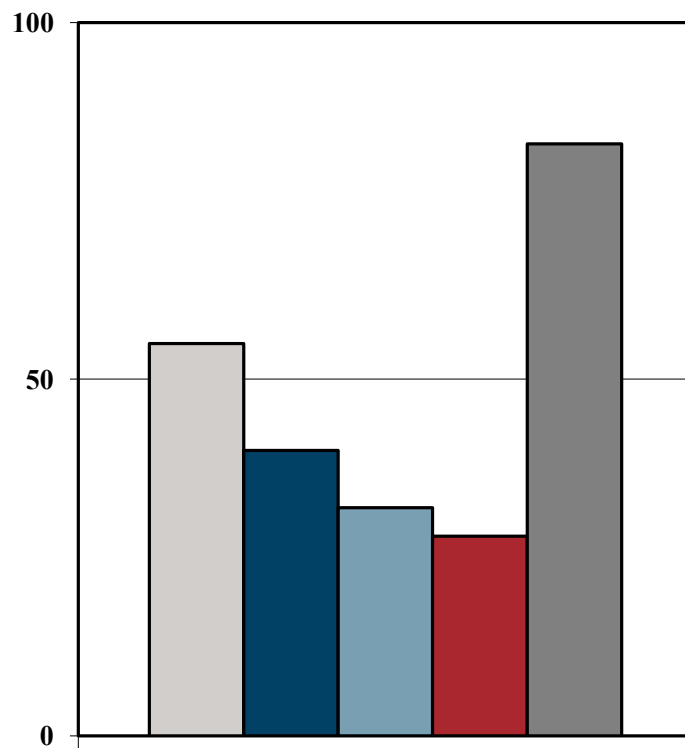
Oil, Energy, and Import Dependence

World Energy Use: 1980-2030



Sources: **History:** Energy Information Administration (EIA), *International Energy Annual 2006* (June-December 2008), web site www.eia.doe.gov/iea. **Projections:** EIA, *World Energy Projections Plus* (2009).

Gulf Energy as Percent of World in 2007

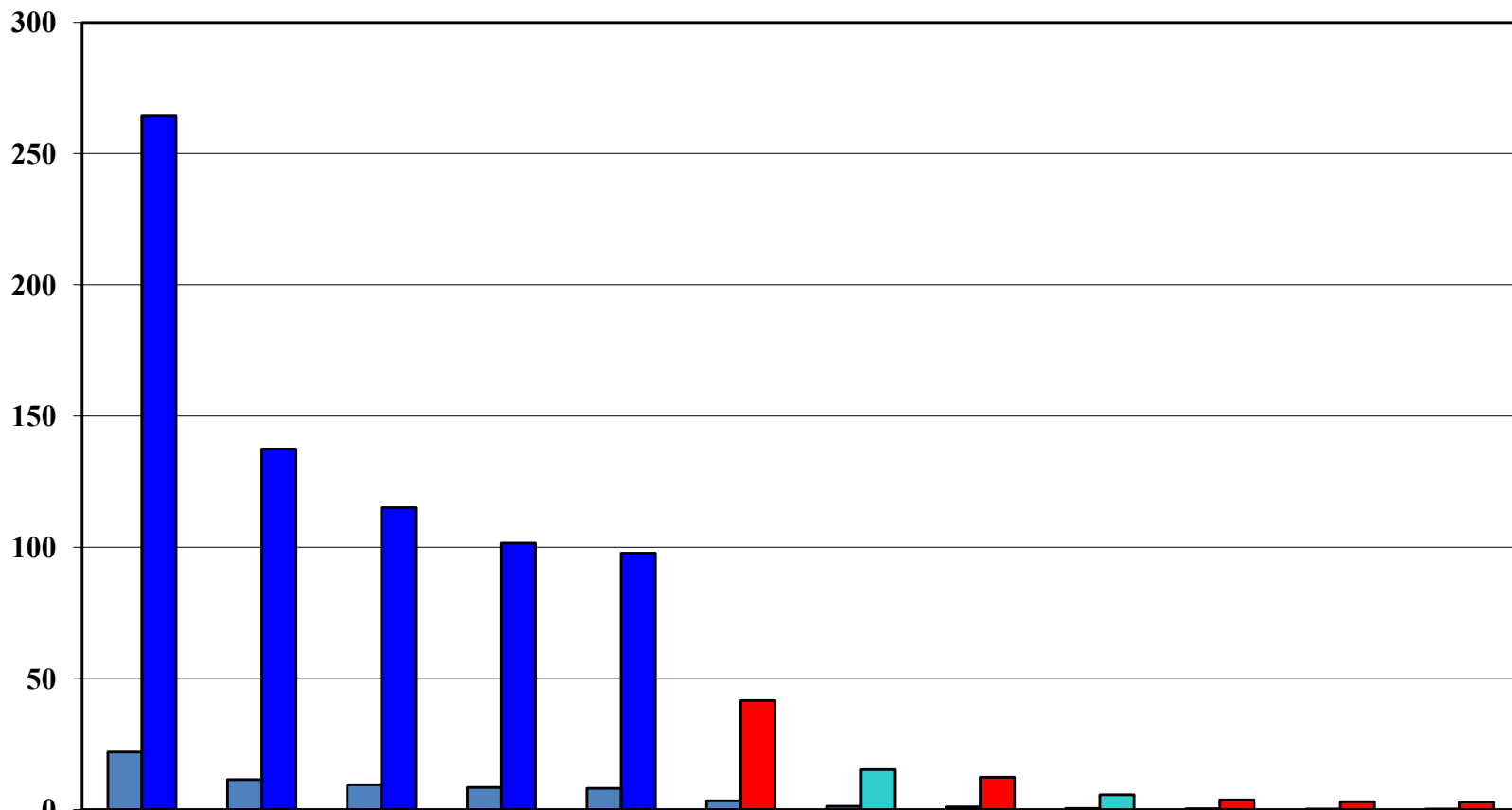


□ Crude Oil Reserves	55
■ Natural Gas Reserves	40
■ Oil Production Capacity	32
■ Oil Production	28
■ Excess Oil Production Capacity	83

World Dependence on Gulf

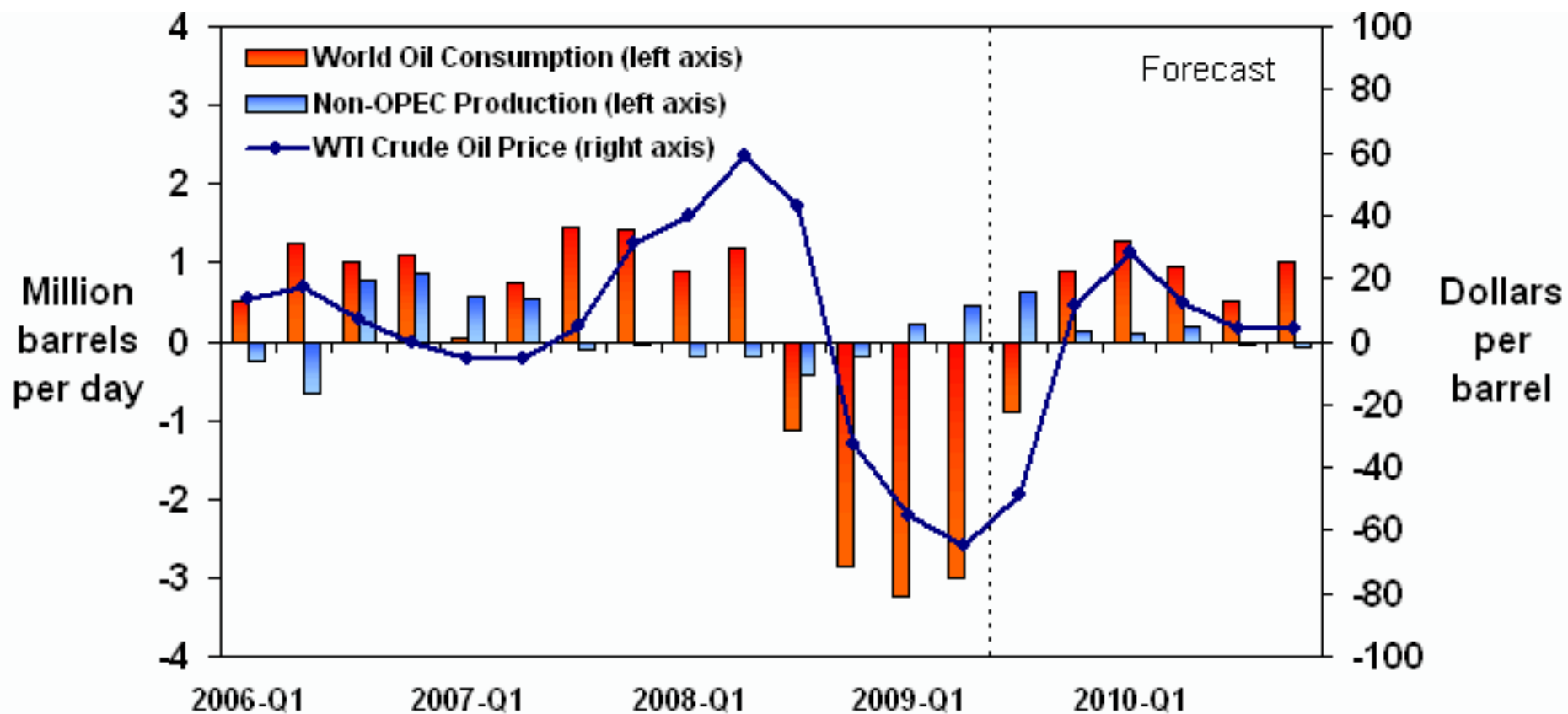
Proven Conventional Oil Reserves

(In Billions of Barrels)



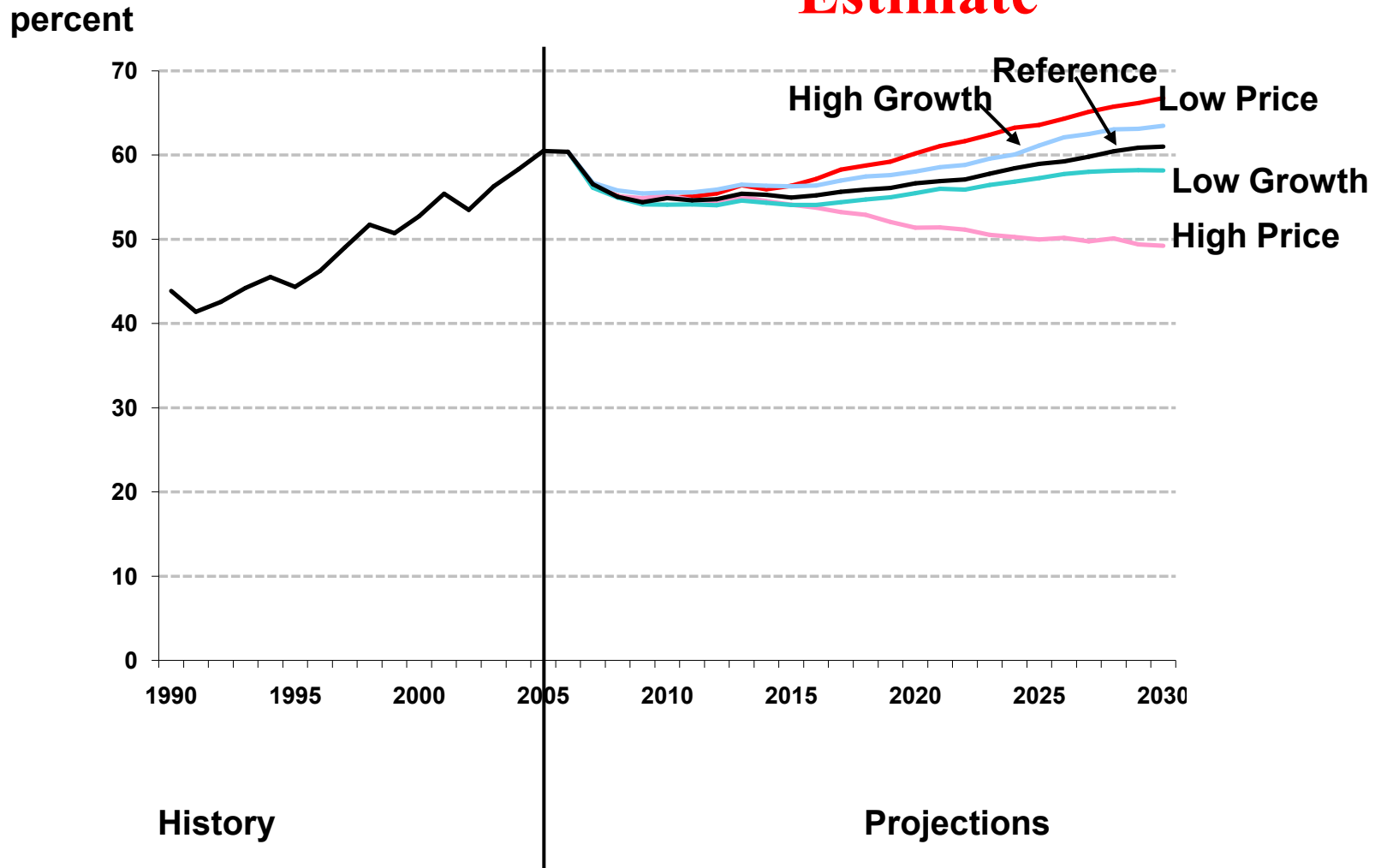
	Saudi Arabia	Iran	Iraq	Kuwait	UAE	Libya	Qatar	Algeria	Oman	Egypt	Syria	Yemen
% of World	21.9	11.4	9.5	8.4	8.1	3.4	1.3	1	0.5	0.3	0.2	0.2
Billions of Barrels	264.3	137.5	115	101.5	97.8	41.5	15.2	12.3	5.6	3.7	3	2.9

World Oil Consumption and Non-OPEC Production

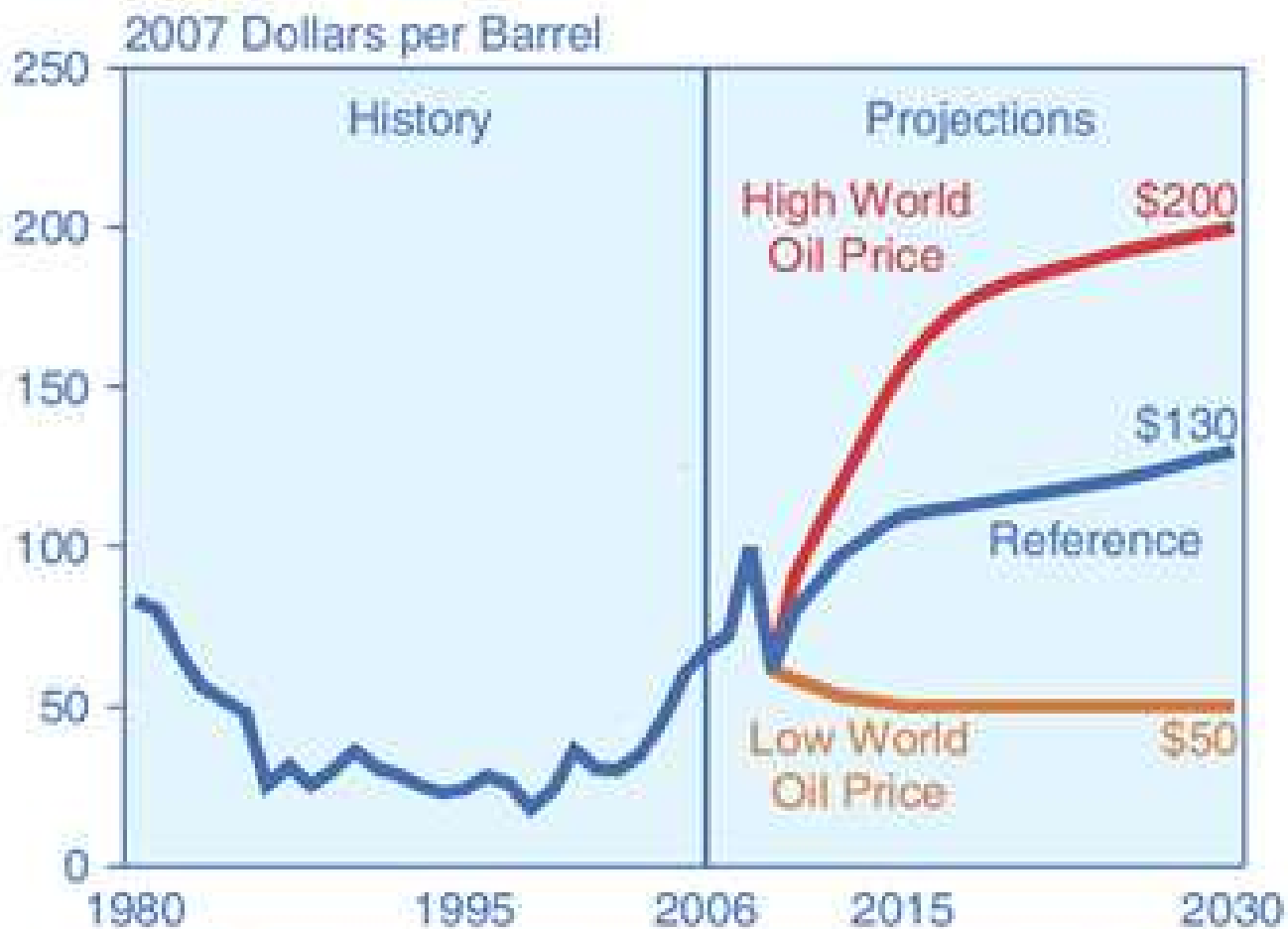


Net Import Share of U.S. Liquid Fuels Consumption, 1990-2030 --- 2007

Estimate



EIA Estimates of Future World Oil Prices

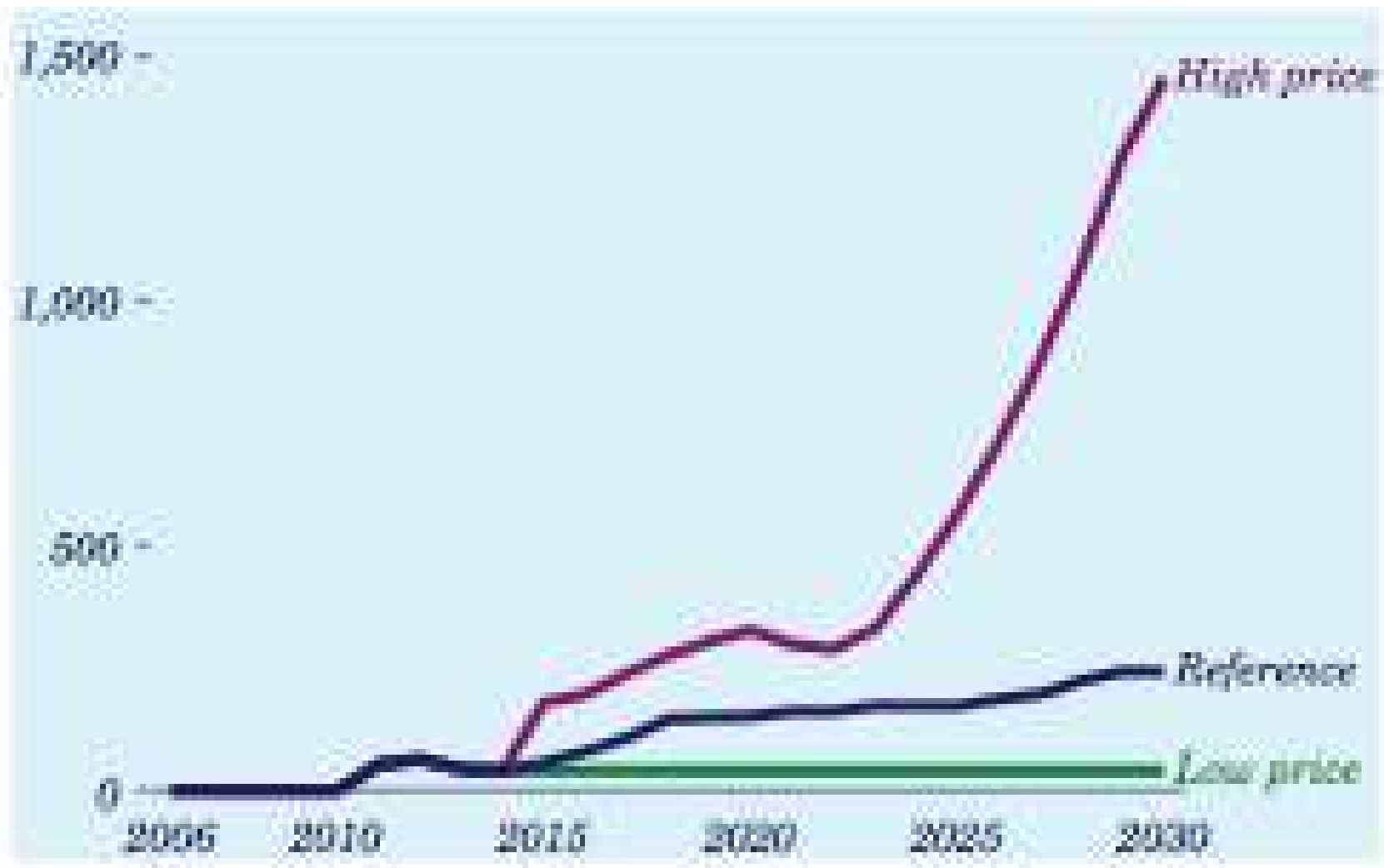


Source: Energy Information Administration (EIA), *Annual Energy Outlook 2009*, DOE/EIA-0383(2009) (Washington, DC, June 2009), web site www.eia.doe.gov/oiaf/aeo.

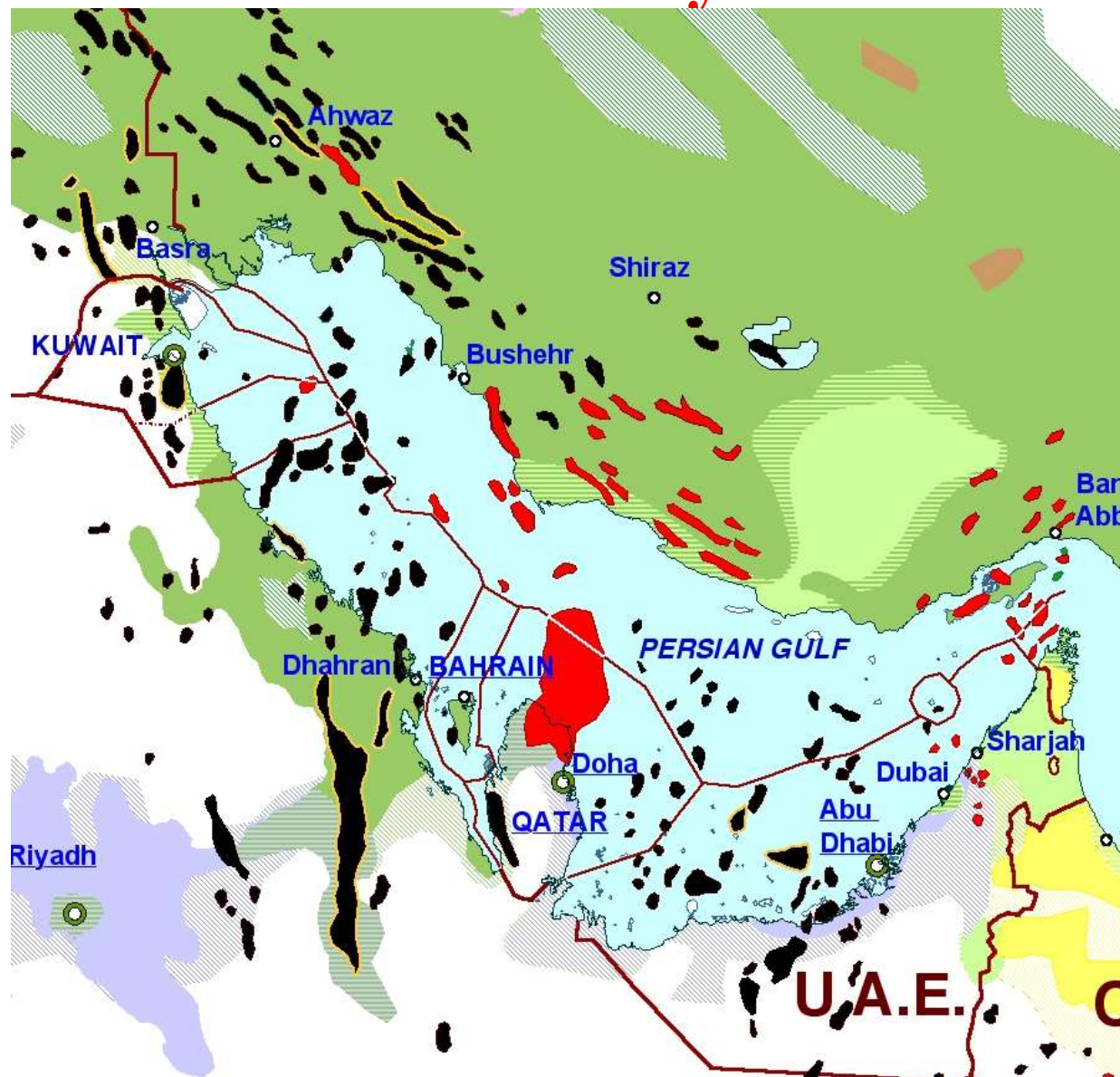
Net Import Share of U.S. Liquid Fuels Consumption, 1990-2030 (2008 Estimate)






Unconventional Share of U.S. Liquid Fuels 1990-2030 (2008 Estimate)



Vulnerability of Gulf Oil Fields






Primary Oil and Gas Deposits in the Middle East and the Shia Majority Areas.

-  A Major Oil field
-  A Super-Giant Oil field
-  A Major Gas field

Islam:

-  Shiism (to include Alevis/Alawis)
-  Sunnism (Hanafi, Shafi'i, Maliki)
-  Wahhabism
-  Ibadism
-  Christianity
-  Judaism
-  Other

-  Mixed population areas
-  Sparsely populated areas
-  Uninhabited areas

Iranian Conventional Military Threats

The GCC Threat to the GCC

- **Vast lead in military spending and arms imports**
- **Support from US, Britain, France**

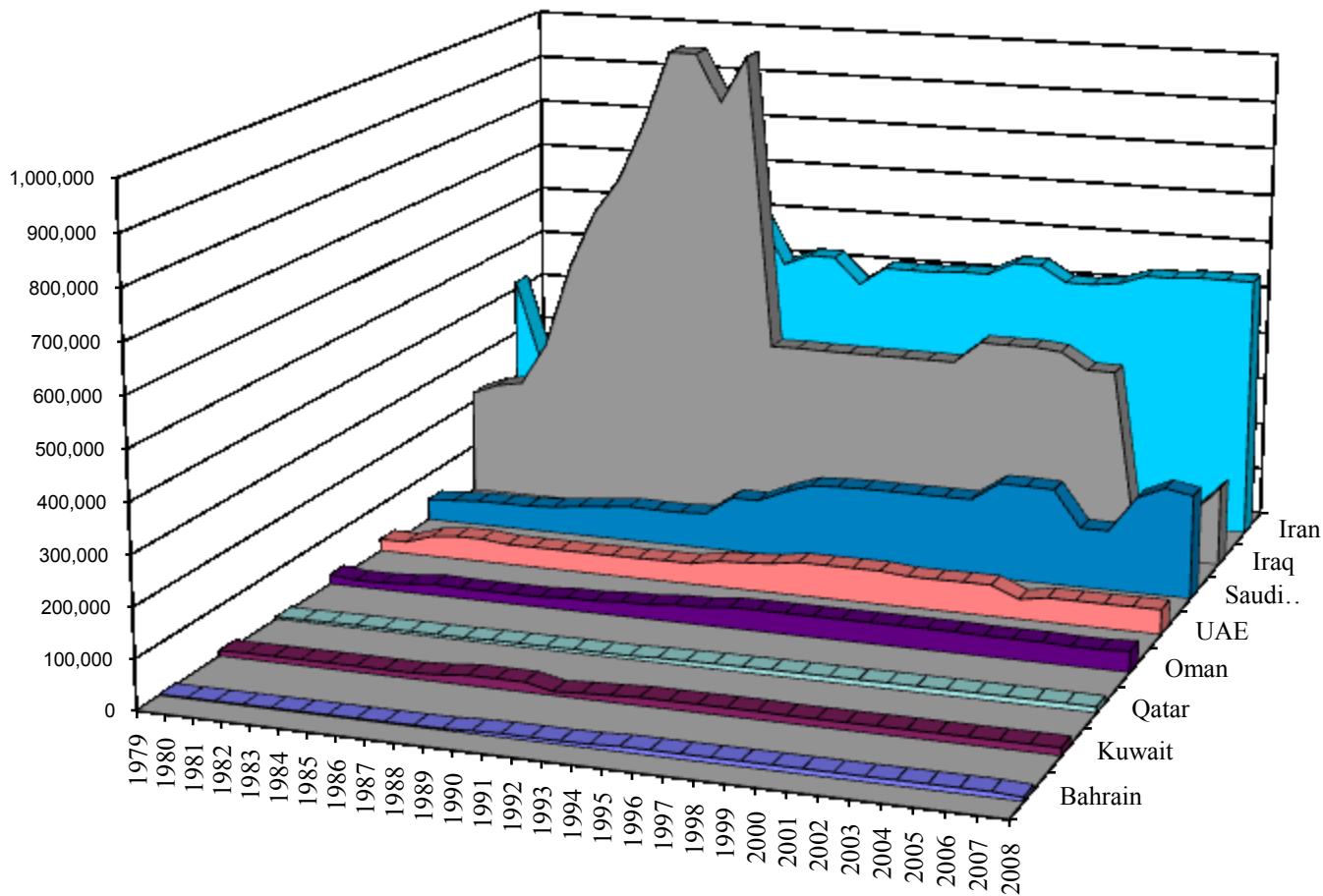
But,

- **Poor Mission Focus with Limited Coordination**
- **Lack of Integration, Standardization**
- **Problems in Large-Scale Exercises and Training; Military Realism**
- **Problems in Jointness – including security services, police, and intelligence – and combined arms.**
- **Lack of Balanced Force Development: Manpower Quality and Sustainability**

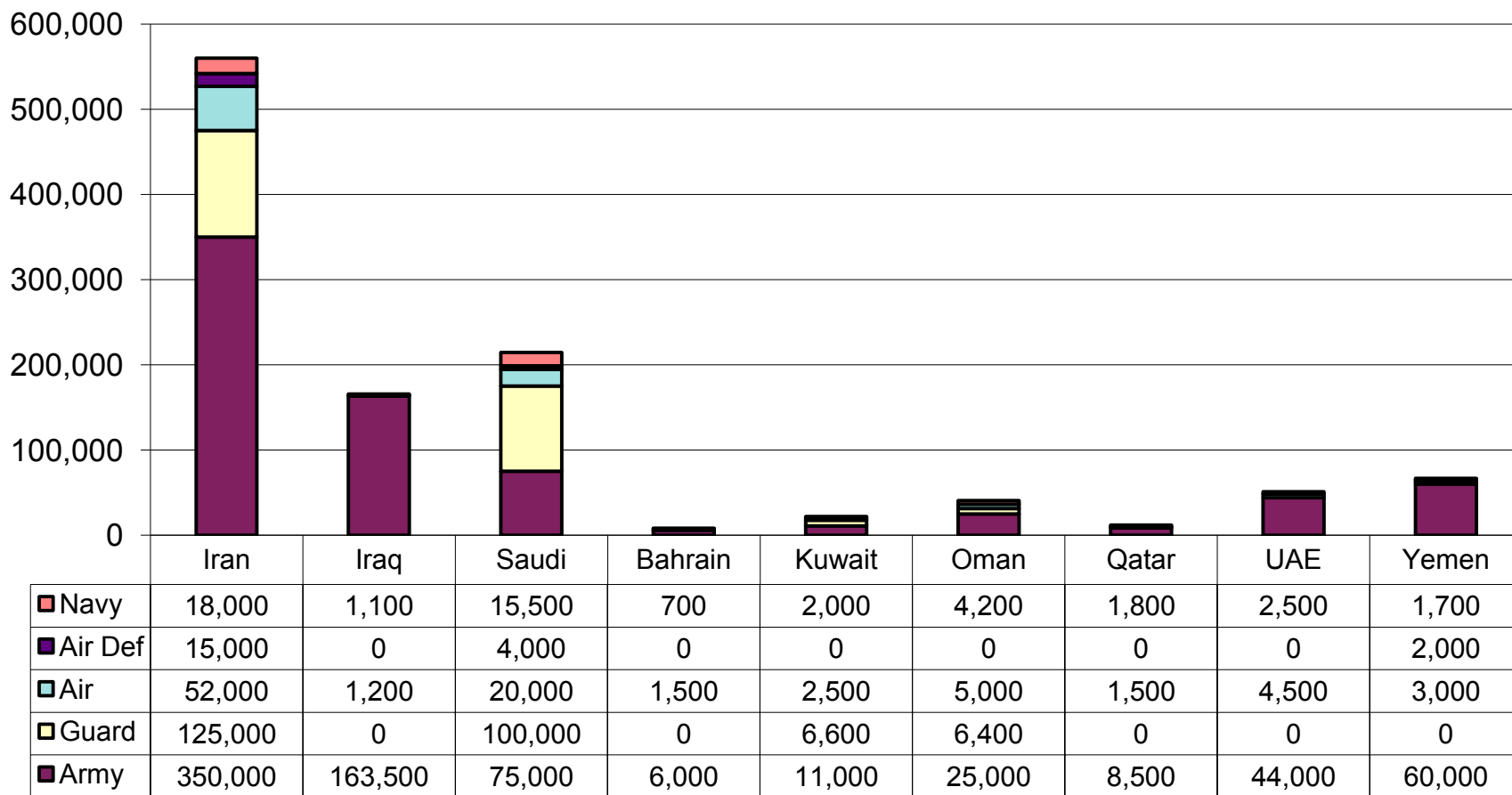
Regional Cooperation on Iran?

- **Truth is there is limited regional cooperation among the Gulf nations with regards to Iran.**
- **Region-wide drive to bolster naval forces to countering the perceived growing threat from Iran.**
- **Oman, like Syria and Qatar, sees in Iran an important political and economic ally that is too powerful and too potentially dangerous to ignore, let alone antagonize; while defying Egypt, Saudi Arabia and other Arab nations in their efforts to curb Iranian influence and Nuclear ambitions.**
- **United Arab Emirates, which is battling with Iranian leaders over the title to three Persian Gulf islands, has done little to stop billions of dollars in annual trade with Iran.**
- **Sunni-led Arab countries are concerned over Tehran's influence with the Shiite-dominated government in Iraq.**
- **Qatar says it is mediating between Iran and Arab powers such as Egypt and Saudi Arabia, where the ruling family feels threatened by Iranian power.**
- **Continued developments in Saudi and Egyptian outreach to Arab nations to unite against Iranian influence and Nuclear Ambitions as well as outreach efforts to Syria in efforts to break Iranian-Syrian ties.**
- **Continued U.S. engagement and “security umbrella” seems to be key to any resemblance of Regional Cooperation in regards to Iran.**

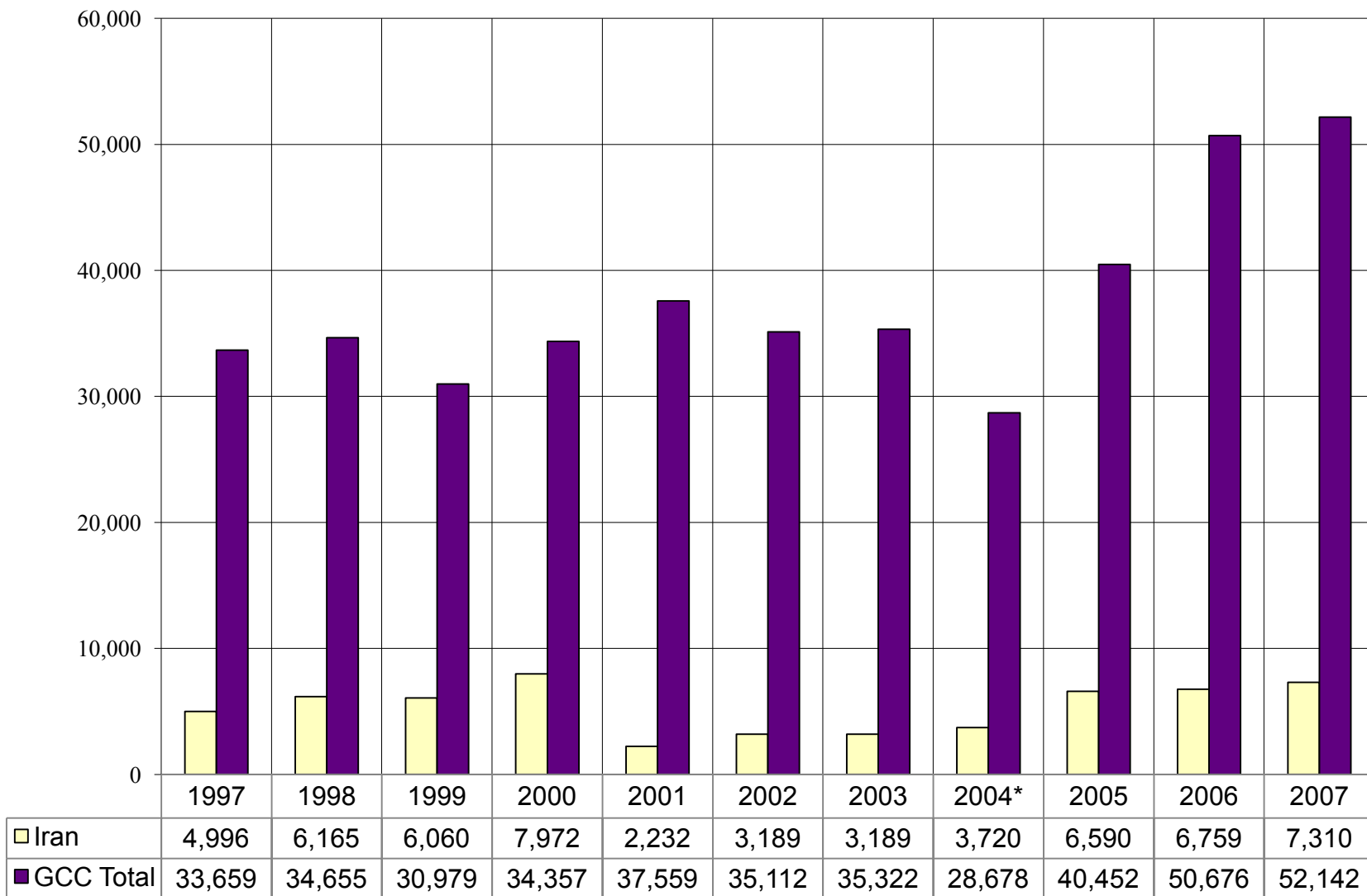
Comparative Military Manpower Trends



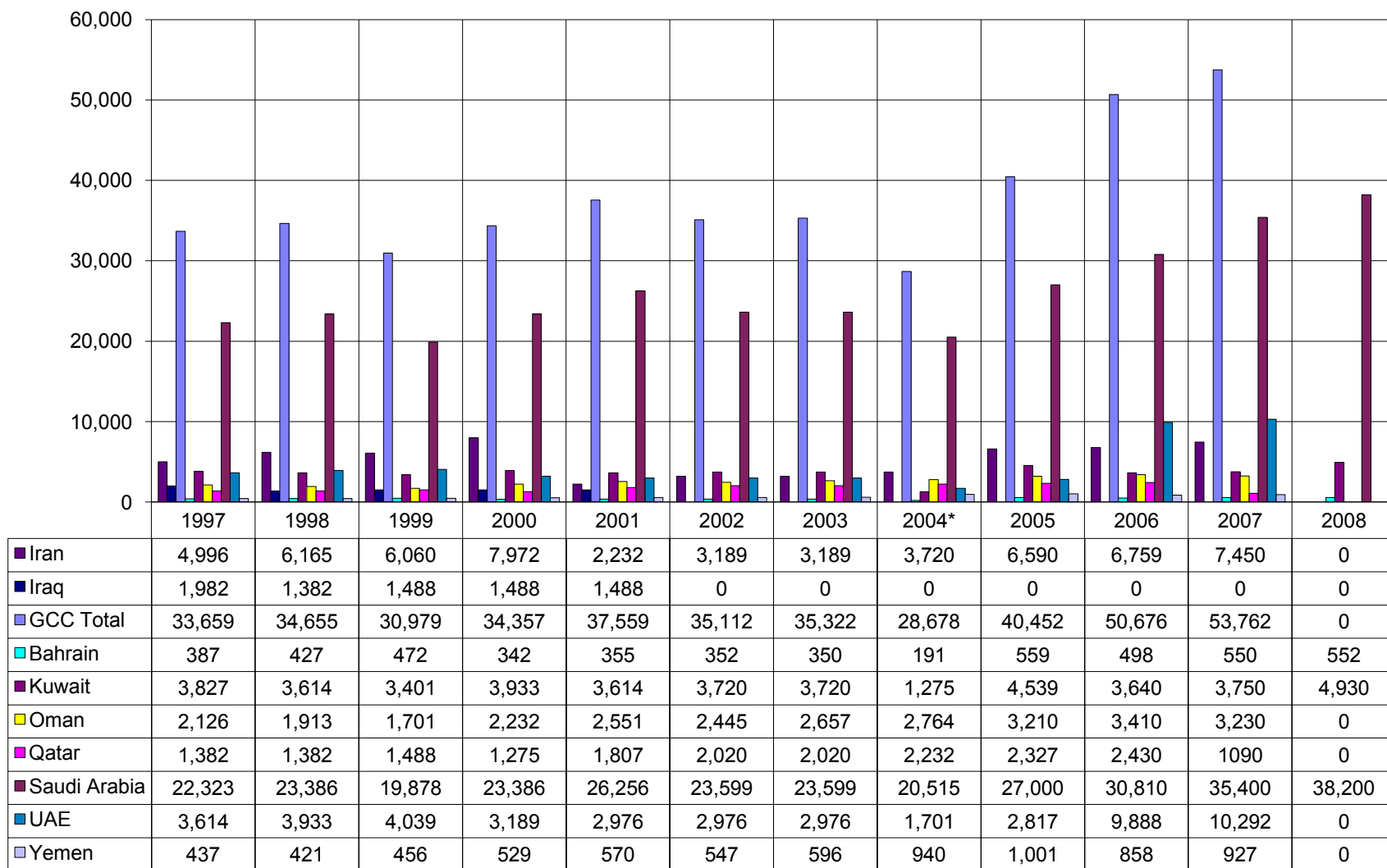
Comparative Military Manpower in 2008



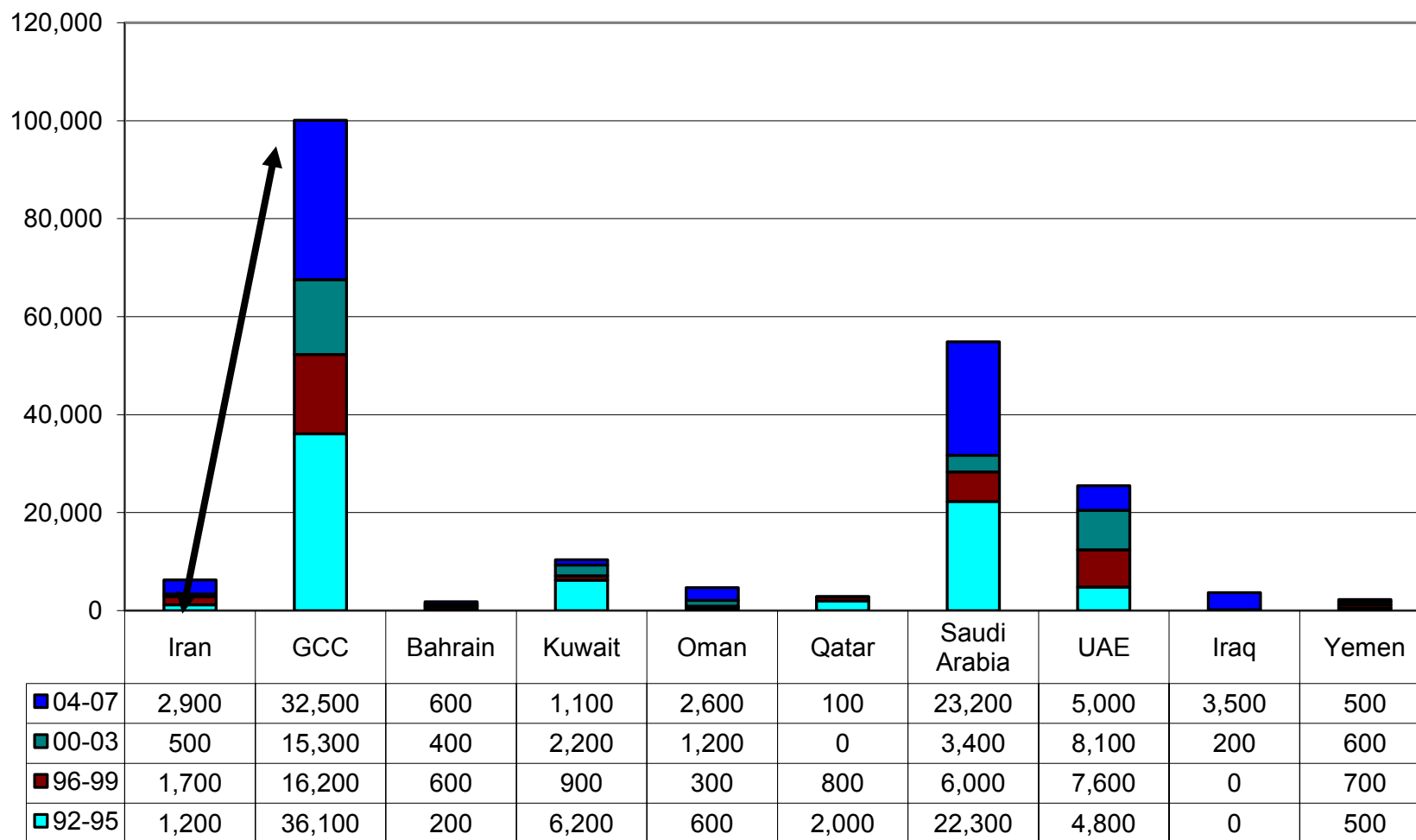
Comparative Iran vs GCC Spending: 1997-2007



Comparative Military Spending: 1997-2008



Comparative New Arms Orders: 1992-2007



0 = Data less than \$50 million or nil. All data rounded to the nearest \$100 million.

Source: Richard F. Grimmett, Conventional Arms Transfers to the Developing Nations, Congressional Research Service, various editions.

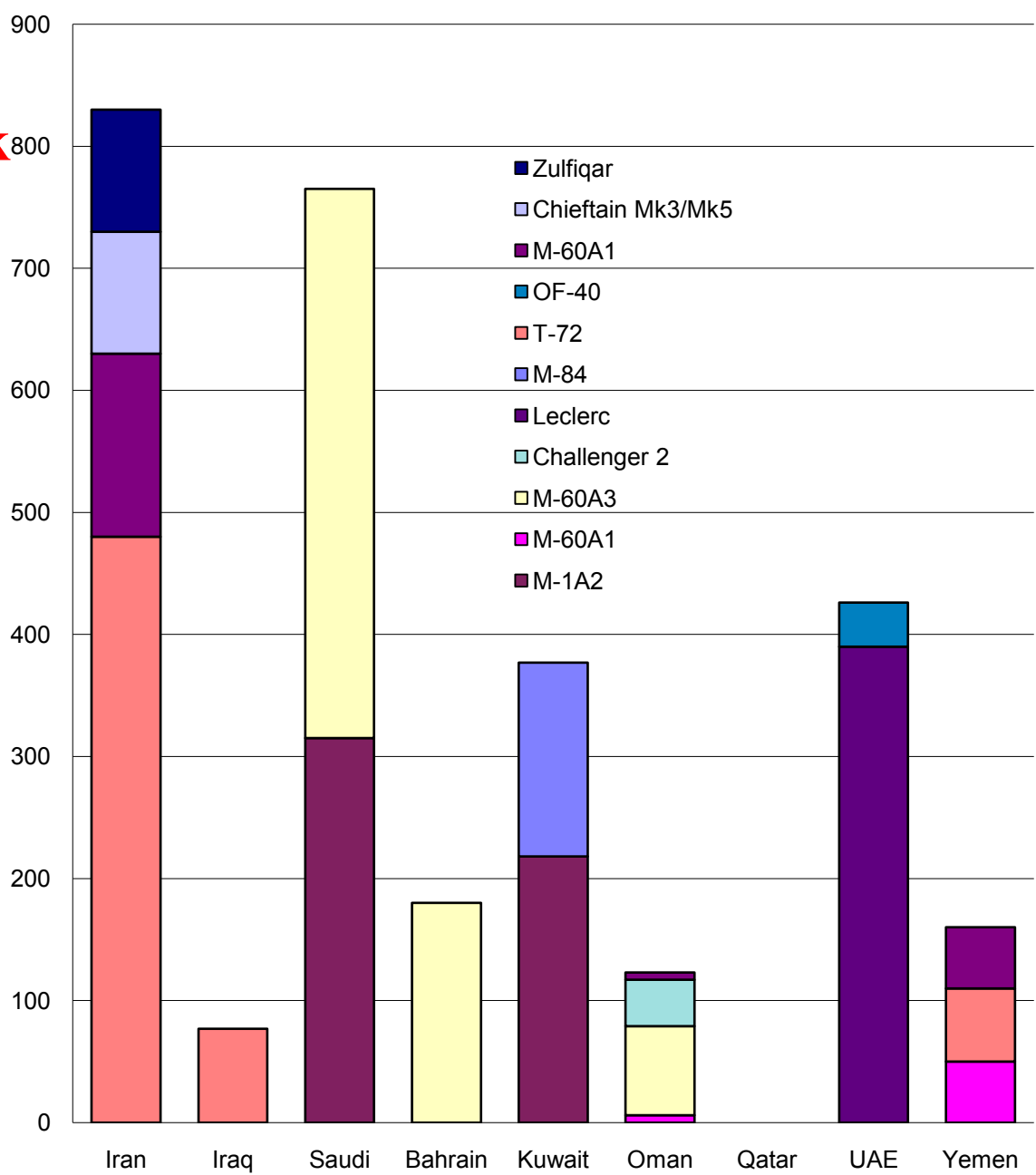
Land Force Threats

- **Iranian Threat to Kuwait and Iraq**
- **Iranian permissive amphibious/ferry operation.**
- **Iranian dominance of Iraq; Invited In to Replace US?**
- **Spillover of Iraqi Sunni-Shi'ite power struggles.**
- **Yemeni incursion into Saudi Arabia or Oman**

But:

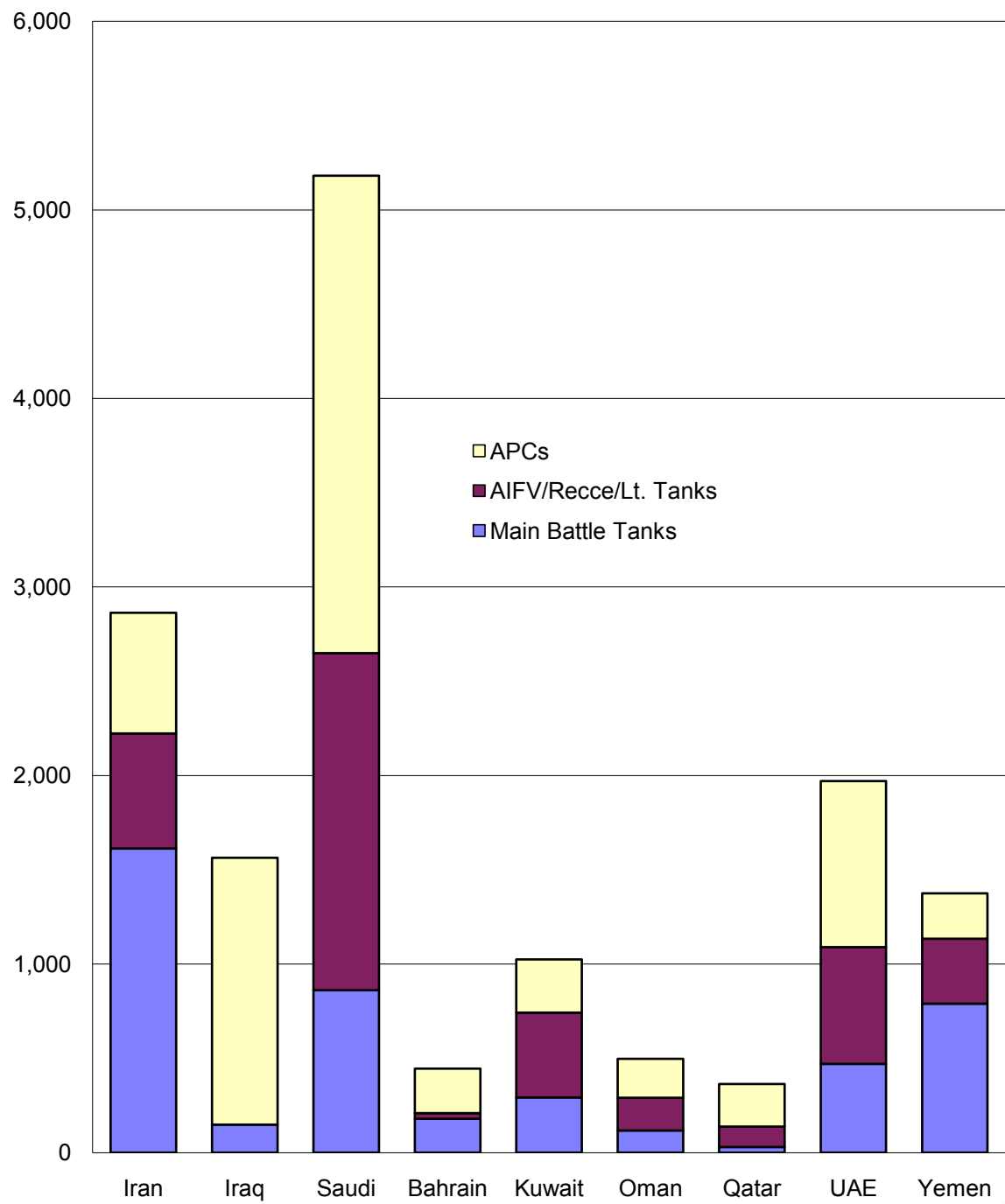
- *Low near-term probability.*
- *High risk of US and allied intervention.*
- *Limited threat power projection and sustainability.*
- *Unclear strategic goal.*

Comparative Modern Tank Strength, 2009



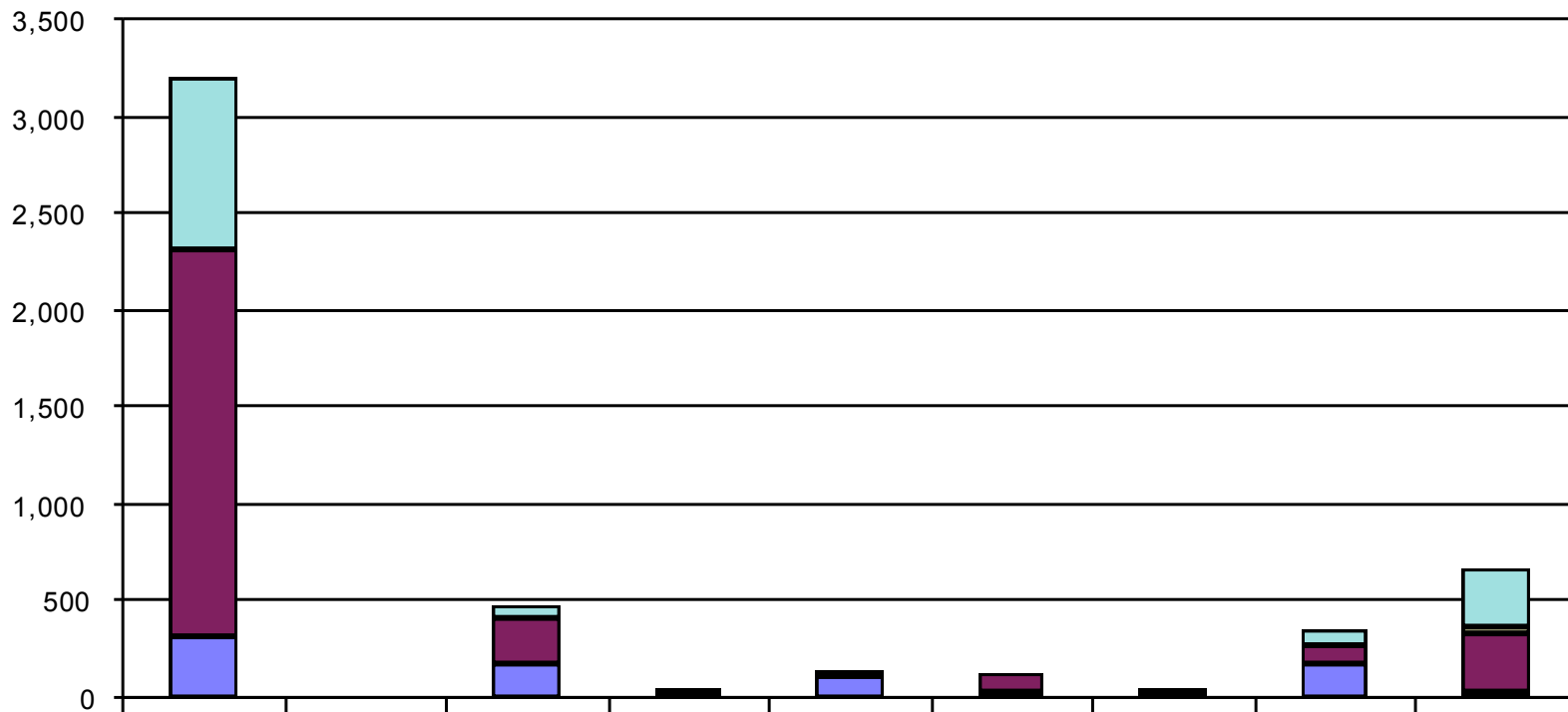
Source: Estimated by Anthony H. Cordesman using data from the IISS, *The Military Balance*, various editions.

Comparative Armored Vehicle Strength, 2009



Source: Estimated by Anthony H. Cordesman using data from various editions of the IISS The Military Balance and Jane's Sentinel.

Comparative Artillery Strength



Multiple Rocket Launcher	876	?	60	9	27	0	4	72	294
Assault and Coastal									
Towed Tube									
Self-Propelled Tube									

Derived from IISS, Military Balance, 2008

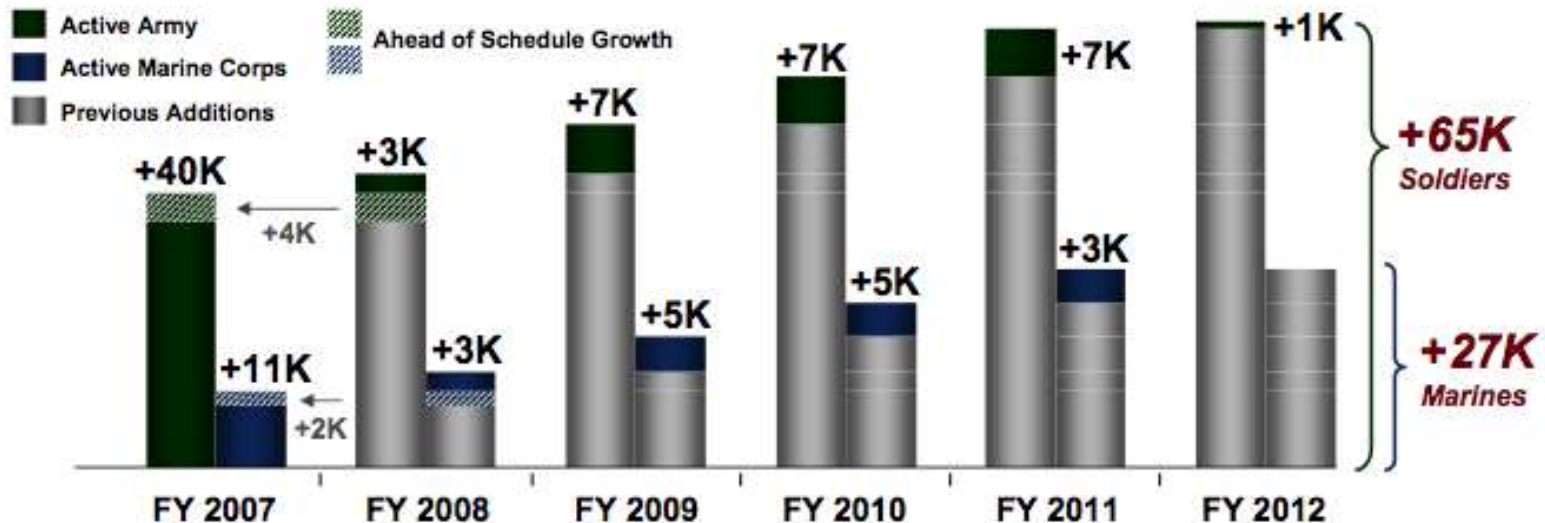
Keeping a Decisive US Qualitative Edge in US Forces and Arms Transfers to the Gulf (\$10.5B in FY087 & FY09)

Joint Ground Capabilities	Joint Maritime Capabilities	Joint Air Capabilities	Space-based Capabilities
<ul style="list-style-type: none"> - Future Combat Systems: <ul style="list-style-type: none"> • Ground and air systems - 119 Stryker Vehicles - 5,249 High Mobility Multi-purpose Wheeled Vehicles - 1,061 Heavy Tactical Vehicles - 3,187 Medium Tactical Vehicles - 29 M1A1 Abrams Tank Upgrades - Chemical Weapons Demilitarization 	<ul style="list-style-type: none"> - CVN 21 Carrier Replacement - 1 Virginia Class Submarine - 1 DDG-1000 Destroyer - 2 Littoral Combat Ships - 2 T-AKE Auxiliary Dry Cargo Ships - CVN Refueling Complex Overhaul - 2 Joint High Speed Vessels 	<ul style="list-style-type: none"> - 16 F-35 Joint Strike Fighters - 20 F-22A Raptors - 36 V-22 Ospreys - 23 F/A-18 Hornets - 22 E/A-18G Growlers - 16 CH-47 Chinooks - VH-71 Helicopter - KC-X Aerial Refueling Tanker - 59 Predators, Reapers and Warriors 	<ul style="list-style-type: none"> - 2 Space Based Infrared Systems - 4 Expendable Launch Vehicles - GPS Satellite - 1 Mobile User Objective System - Transformational Satellite - Advanced Extremely High Frequency Satellite - Wideband Global SATCOM - Ballistic Missile Defense
<p><i>Basic Research +\$0.3B in FY 2009 (+\$1.4B FY09-FY13)</i></p>			

Increase Ground Capabilities

+\$8.7B
FY08 - FY09

Army Active	42	Brigade Combat Teams (482.4K Soldiers)	➔	48	Brigade Combat Teams (547.4K Soldiers)
	12/12	Months Home Station / Months Deployed		24/12	Months Home Station / Months Deployed
Marine Corps Active	2.5	Marine Expeditionary Forces (175K Marines)	➔	3	Marine Expeditionary Forces (202K Marines)
	7/7	Months Home Station / Months Deployed		14/7	Months Home Station / Months Deployed



Source: FY 2009 DoD Budget Request; FY 2008 Budget; FY 2007 Supplemental

Numbers may not add due to rounding

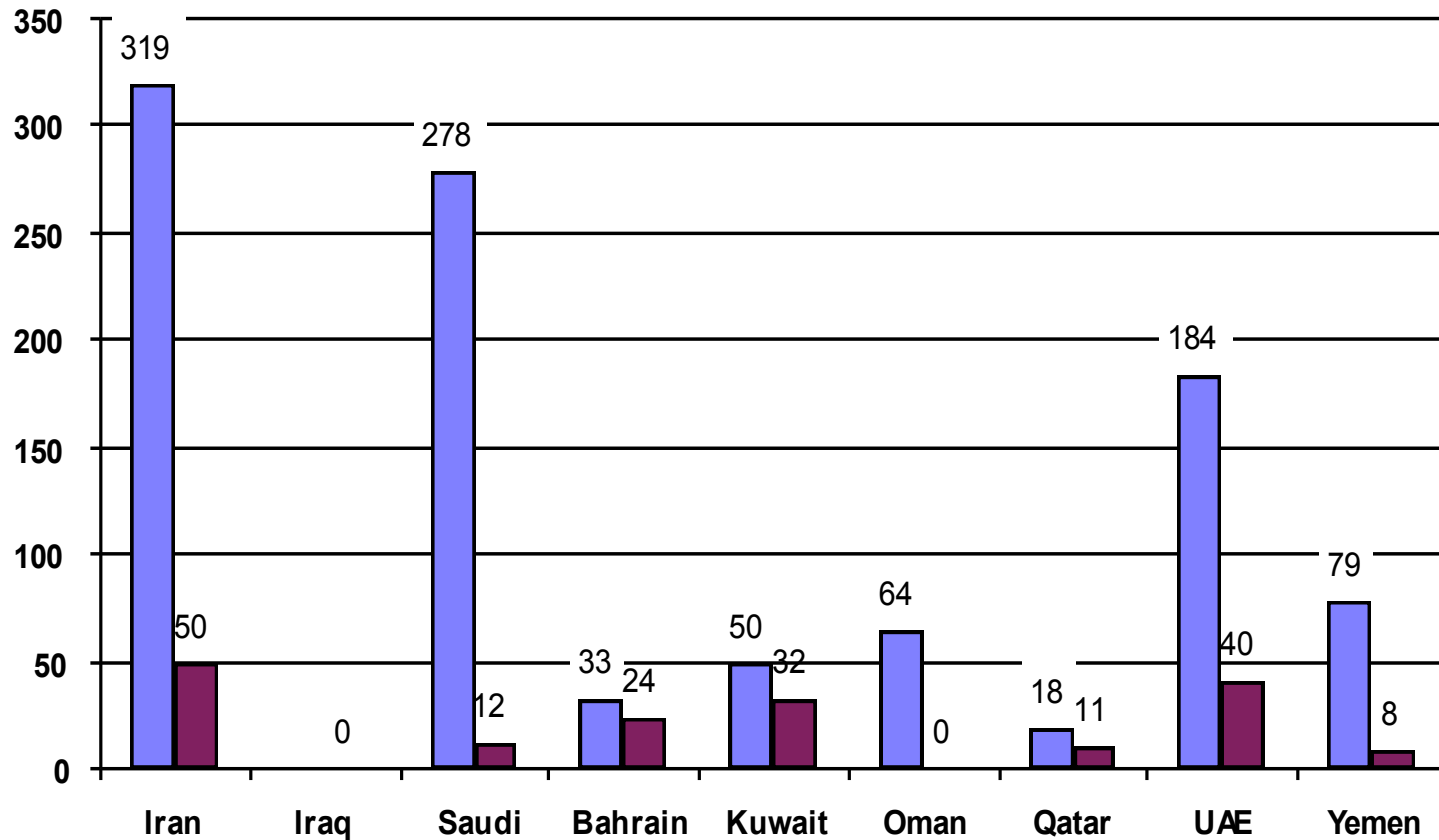
Air/Missile Threats

- **Precision air strikes on critical facilities: Raid or mass attack.**
- **Terror missile strikes on area targets; some chance of smart, more accurate kills.**
- **Variation on 1987-1988 “Tanker War”**
- **Raids on offshore and critical shore facilities.**
- **Strikes again tankers or naval targets.**
- **Attacks on US-allied facilities**
- **Use of UAVs as possible delivery systems (conventional or Unconventional munitions)**

But:

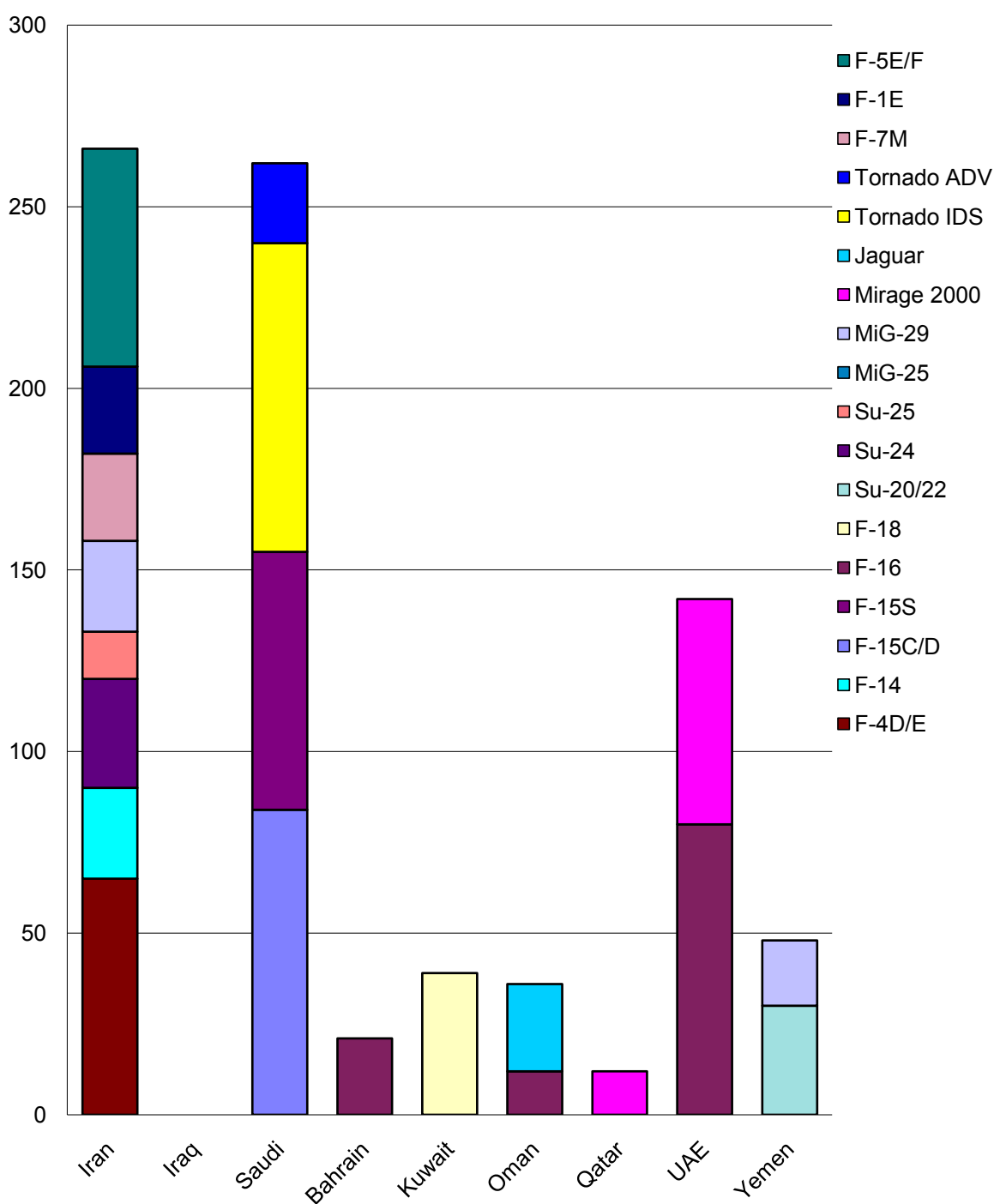
- *Low near-term probability.*
- *High risk of US and allied intervention.*
- *Limited threat power projection and sustainability.*
- *Unclear strategic goal.*

Comparative Combat Air Strength



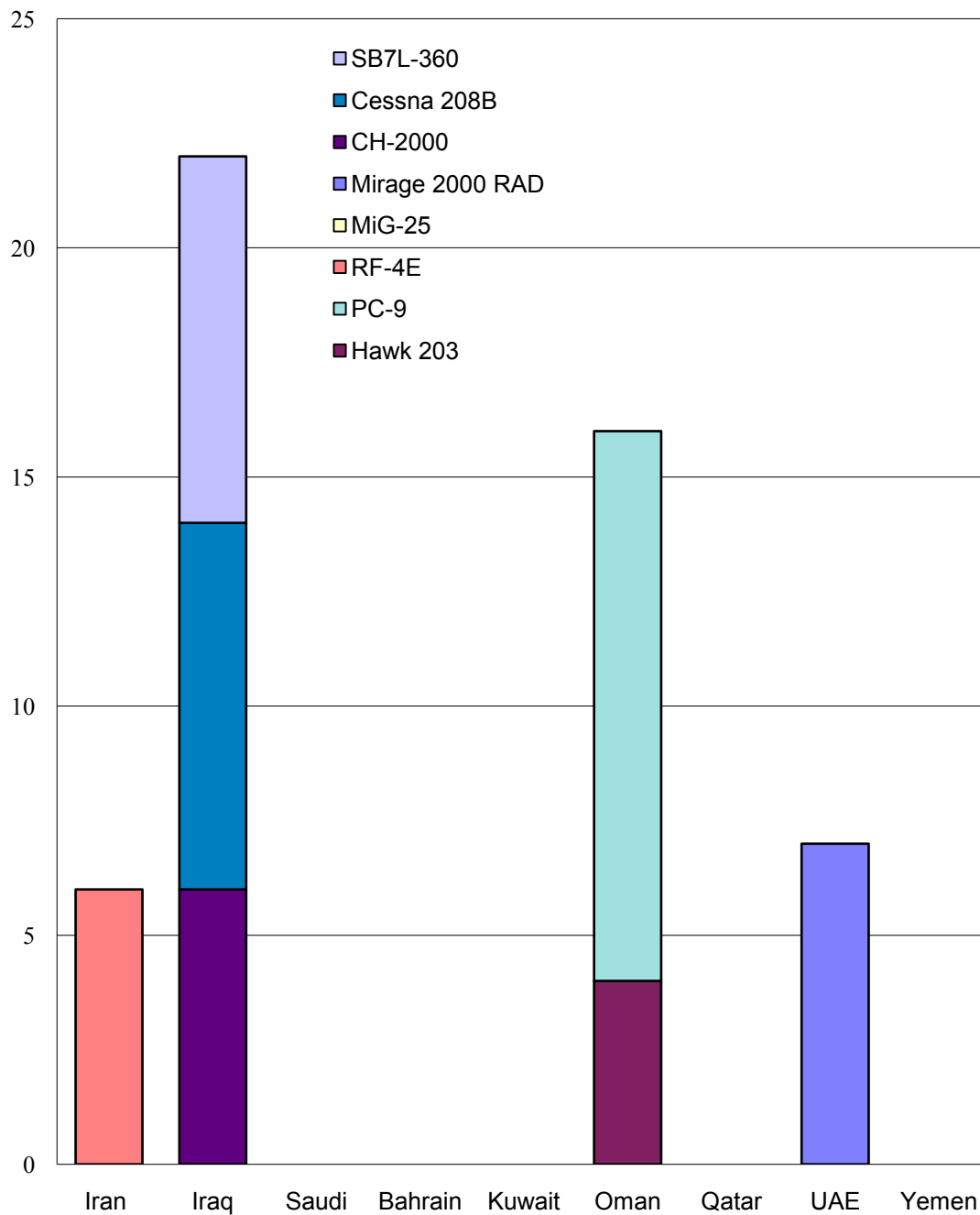
Derived from IISS, Military Balance, 2008

Comparative High Quality Fighter/Attack, 2009



Source: Adapted by Anthony H. Cordesman from various sources and IISS, *The Military Balance*, various editions and *Country Reports*.

Comparative Gulf Reconnaissance Aircraft, 2009



Iranian UAV Projects / Assets 2009

Prime Manufacturer	Designation	Development / Production	Operation	Payload Wt.	Endurance (hr)	Range	Ceiling (ft)	Mission
Unknown	Stealth	Underway / Underway	Deployed			700 km		R/S*
HESA	Ababil (Swallow)	Complete / Underway	Deployed	45 kg	1.5+	150 km	14,000	Multiple variants for R/S* - attack - ISR**
Shahbal Group, Sharif Univ.	Shahbal	Underway		5.5 kg		12 km	4,500	R/S*
Asr-e Talai Factories	Mini-UAV	Underway						Surveillance
FARC	Sobakbal	Underway / Underway	Deployed	0.35 kg	2	2.7 - 13.5 mi	19,686	Surveillance
Qods Aeronautics Industries	Mohajer II/III (Dorna); Mohajer IV (Hodhod); Saeqeh I/II; Tallash I/Endeavor; Tallash II Hadaf 3000	Complete / Underway	Deployed					Multirole aka Lightning Bolt Target drone - aka Target 3000

Source: Adapted by Adam C. Seitz from AIAA Aerospace 2009 Worldwide UAV Roundup; available at: http://www.aiaa.org/Aerospace/images/articleimages/pdf/UAVs_APR2009.pdf.

*R/S: Reconnaissance / Surveillance; **ISR: Intelligence / Surveillance / Reconnaissance

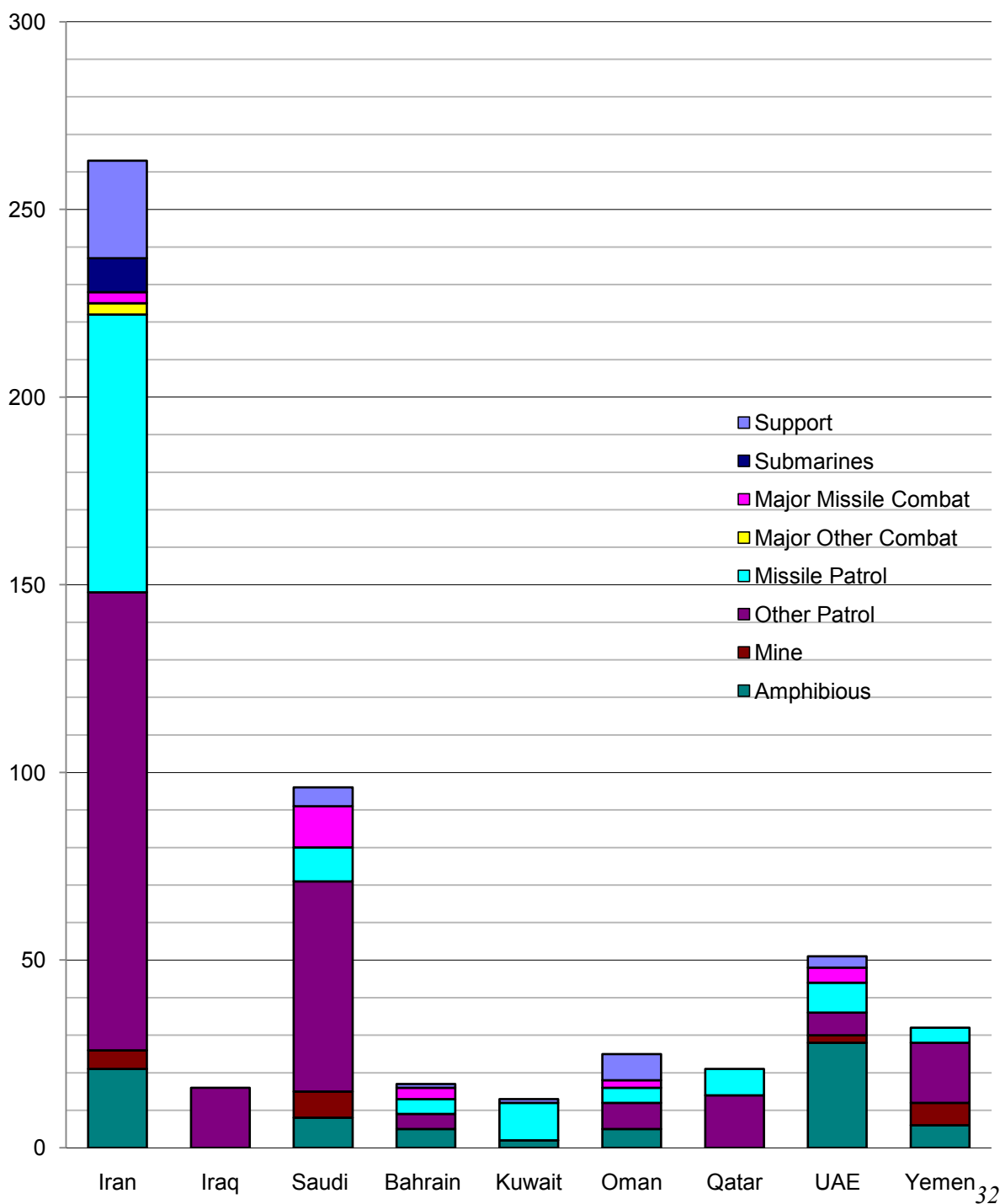
Naval Threats

- Iranian effort to “close the Gulf.”
- Iranian permissive amphibious/ferry operation.
- Variation on 1987-1988 “Tanker War”
- Raids on offshore and critical shore facilities.
- “Deep strike” with air or submarines in Gulf of Oman or Indian Ocean.
- Attacks on US facilities

But:

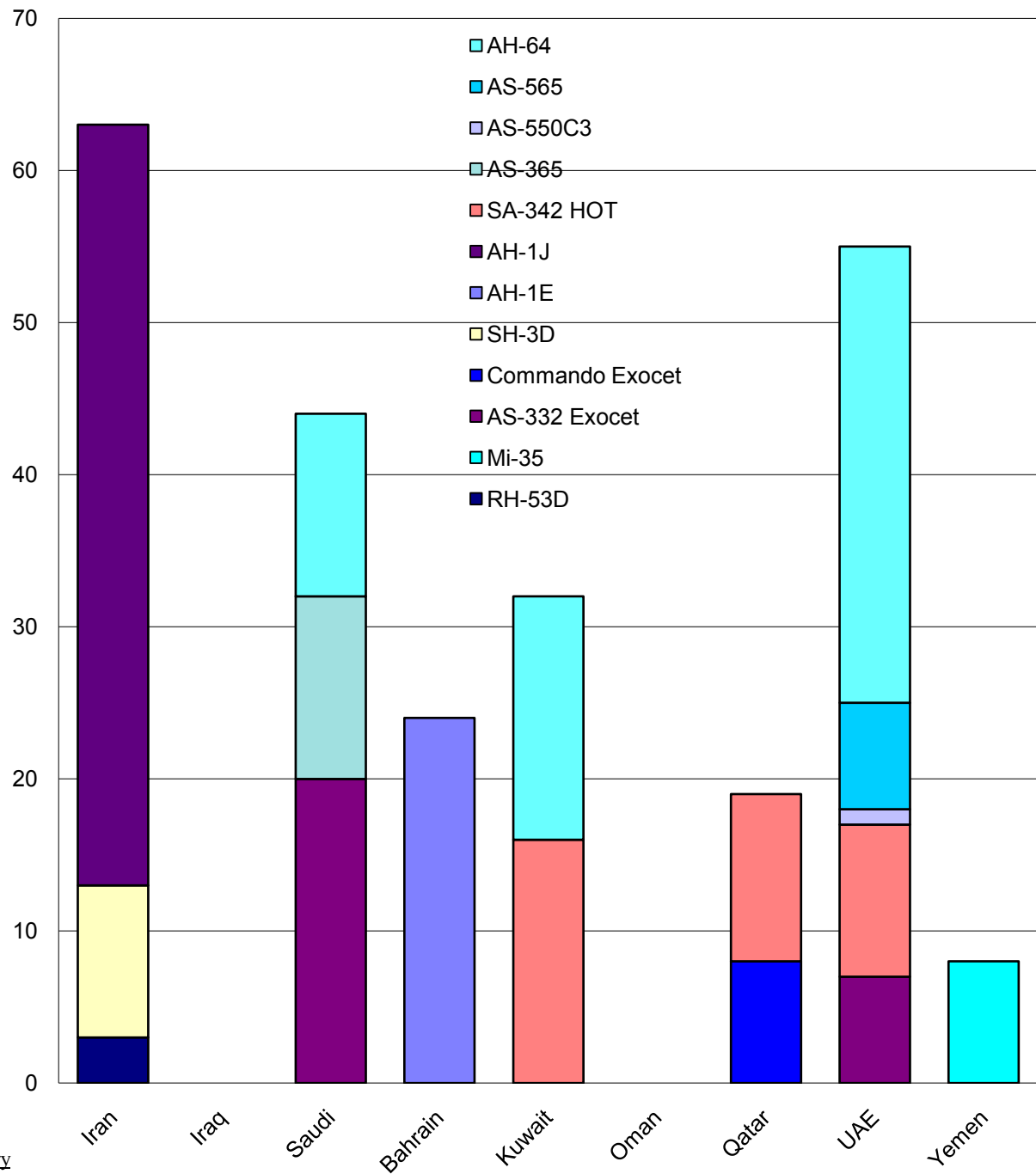
- *Low near-term probability.*
- *High risk of US and allied intervention.*
- *Limited threat power projection and sustainability.*
- *Unclear strategic goal.*

Comparative Major Naval Combat Ships, 2009



Source: Adapted by Anthony H. Cordesman from IISS, *The Military Balance*, various editions.

Comparative Gulf Attack, Anti-Ship and ASW Helicopters, 2009

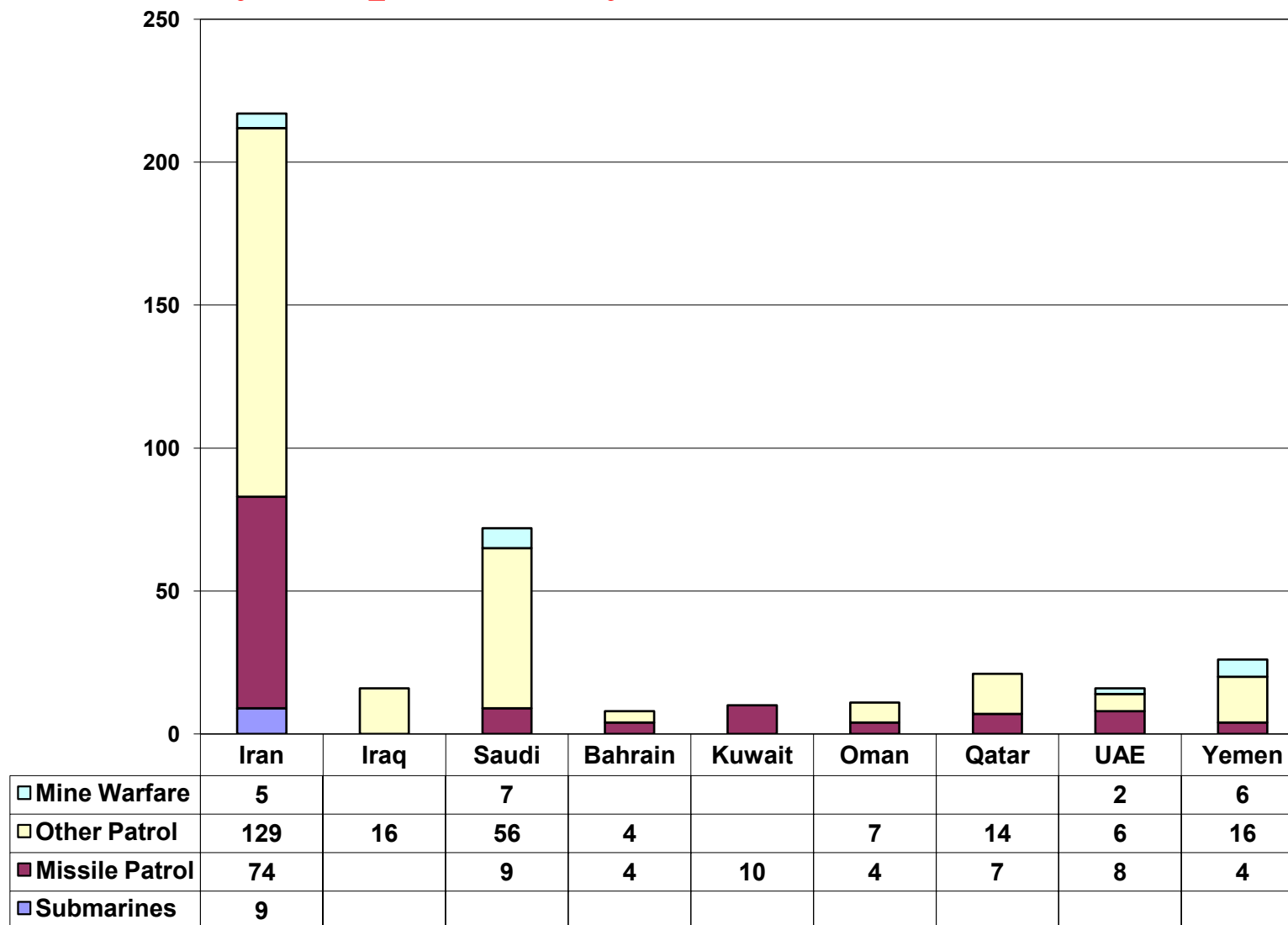


Asymmetric Warfare and “Wars of Intimidation”

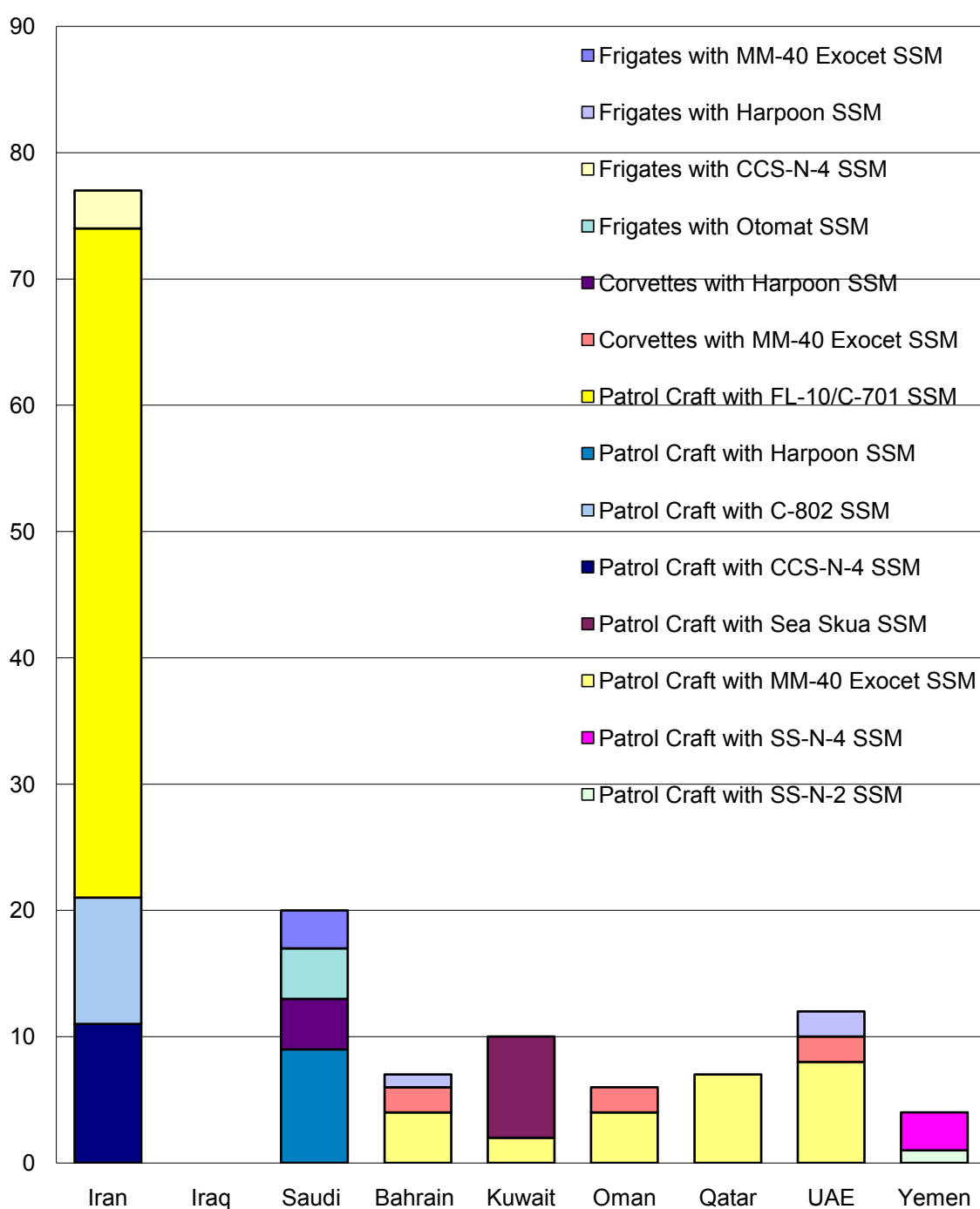
Most Likely Foreign Threats Are Not Formal Conflicts

- **Direct and indirect threats of using force. (I.e. Iranian efforts at proliferation)**
- **Use of irregular forces and asymmetric attacks.**
- **Proxy conflicts using terrorist or extremist movements or exploiting internal sectarian, ethnic, tribal, dynastic, regional tensions.**
- **Arms transfers, training in host country, use of covert elements like Quds force.**
- **Harassment and attrition through low level attacks, clashes, incidents.**
- **Limited, demonstrative attacks to increase risk, intimidation.**
- **Strike at critical node or infrastructure.**

Key Ships for Asymmetric Warfare

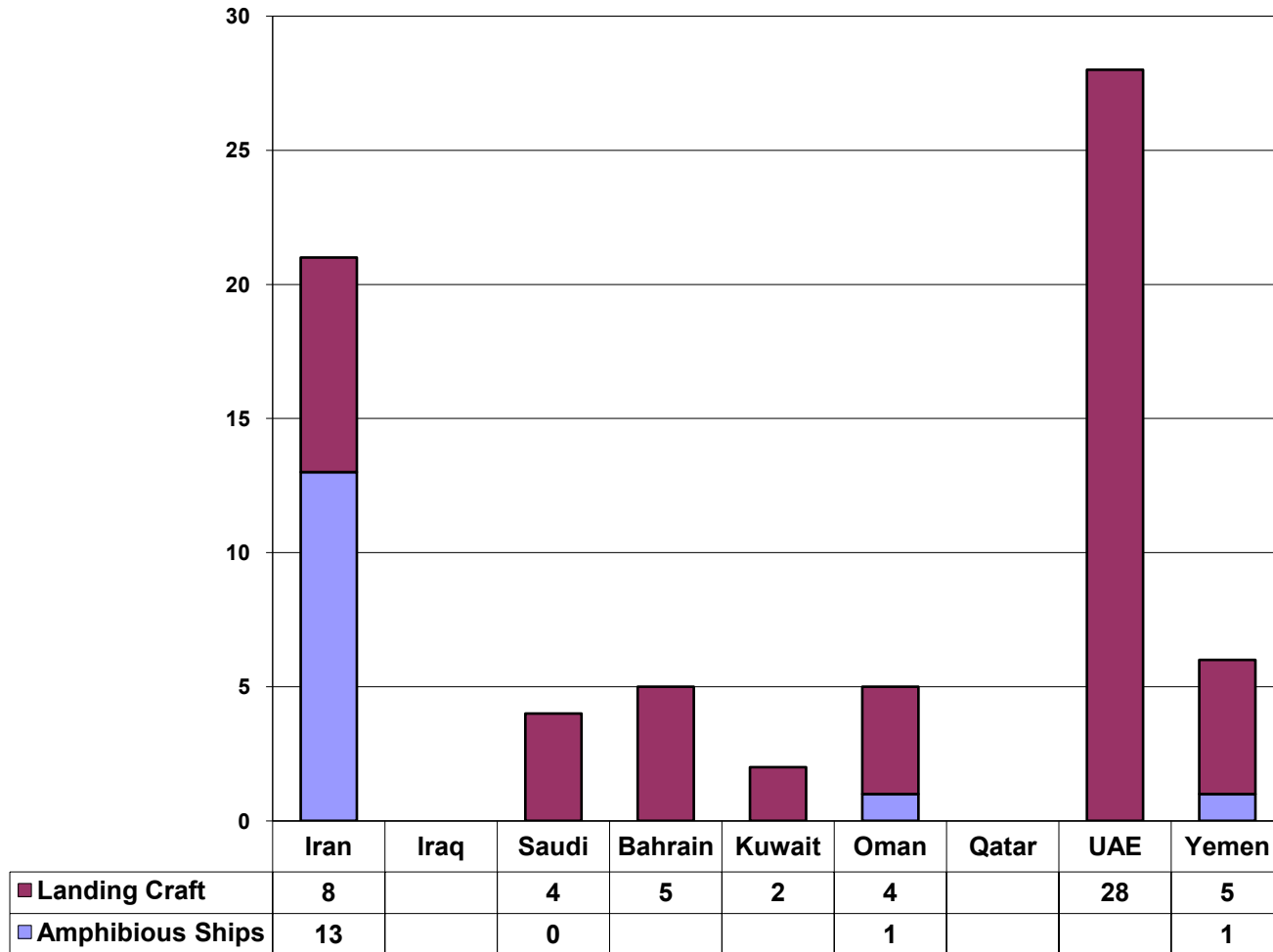


Gulf Warships with Anti-Ship Missiles, 2009



Source: Adapted by Anthony H. Cordesman from IISS, *The Military Balance*, various editions and material provided by US and Saudi experts.

Amphibious Ships & Landing Craft, 2009



Source: Adapted by Anthony H. Cordesman from IISS, *The Military Balance*, various editions, Jane's Sentinel series, and material provided by US and Saudi experts. Estimates differ on Saudi landing craft, because of different ways to count operational status. Some experts put the figure at 6 LCMs and 2 LCUs.

The Islamic Revolutionary Guards Corps

- **125,000+, drawing on 1,000,000 Basij.**
- **Key is 20,000 Naval Guards, including 5,000 marines.**
 - **Armed with HY-3 CSS-C-3 Seersucker (6-12 launchers, 100 missiles, 95-100 km), and 10 Houdong missile patrol boats with C-802s (120 km), and 40+ Boghammers with ATGMs, recoilless rifles, machine guns.**
 - **Large-scale mine warfare capability using small craft and commercial boats.**
 - **Based at Bandar e-Abbas, Khorramshar, Larak, Abu Musa, Al Farsiya, Halul, Sirri.**
- **IRGC air branch reported to fly UAVs and UCAVs, and control Iran's strategic missile force.**
 - **1 Shahab SRBM Bde (300-500-700 km) with 12-18 launchers, 1 Shahab 3 IRBM Btn (1,200-1,280 km) with 6 launchers and 4 missiles each.**

IRGC Key Assets and Capabilities

- **The IRGC has a wide variety of assets at its disposal to threaten shipping lanes in the Gulf, Gulf of Oman, and the Caspian Sea.**
- **3 Kilo (Type 877) and unknown number of midget (Qadr-SS-3) submarines; smart torpedoes, (anti-ship missiles?) and smart mine capability.**
- **Use of 5 minelayers, amphibious ships, small craft, commercial boats.**
- **Attacks on tankers, shipping, offshore facilities by naval guards.**
- **Raids with 8 P-3MP/P-3F Orion MPA and combat aircraft with anti-ship missiles(C-801K (8-42 km), CSS-N-4, and others).**
- **Free-floating mines, smart and dumb mines, oil spills.**
- **Land-based, long-range anti-ship missiles based on land, islands (Seersucker HY-2, CSS-C-3), and ships (CSS-N-4, and others. Sunburn?).**
- **Forces whose exercises demonstrate the capability to raid or attack key export and infrastructure facilities.**

IRGC Naval Branch Modernization

- **Large numbers of anti-ship missiles on various types of launch platforms.**
- **Small fast-attack craft, heavily armed with rockets or anti-ship missiles.**
- **More fast mine-laying platforms.**
- **Enhanced subsurface warfare capability with various types of submarines and sensors.**
- **More small, mobile, hard-to-detect platforms, such as semi-submersibles and unmanned aerial vehicles.**
- **More specialized training.**
- **More customized or purpose-built high-tech equipment.**
- **Better communications and coordination between fighting units.**
- **More timely intelligence and effective counterintelligence/deception.**
- **Enhanced ability to disrupt the enemies command, control, communications, and intelligence capability.**
- **The importance of initiative, and the avoidance of frontal engagements with large U.S. naval surface warfare elements.**
- **Means to mitigate the vulnerability of even small naval units to air and missile attack.**

IRGC Naval Branch

- **The IRGC has a naval branch consists of approximately 20,000 men, including marine units of around 5,000 men.**
- **The IRGC is now reported to operate all mobile land-based anti-ship missile batteries and has an array of missile boats; torpedo boats; catamaran patrol boats with rocket launchers; motor boats with heavy machine guns; mines as well as Yono (Qadir)-class midget submarines; and a number of swimmer delivery vehicles.**
- **The IRGC naval forces have at least 40 light patrol boats, 10 Houdong guided missile patrol boats armed with C-802 anti-ship missiles.**
- **The IRGC controls Iran's coastal defense forces, including naval guns and an HY-2 Seersucker land-based anti-ship missile unit deployed in five to seven sites along the Gulf coast.**
- **The IRGC has numerous staging areas in such places and has organized its Basij militia among the local inhabitants to undertake support operations.**
- **IRGC put in charge of defending Iran's Gulf coast in September 2008 and is operational in the Gulf and the Gulf of Oman, and could potentially operate elsewhere if given suitable sealift or facilities.**
- **Can deliver conventional weapons, bombs, mines, and CBRN weapons into ports and oil and desalination facilities.**
- **Force consists of six elements: surface vessels, midget and unconventional submarines, missiles and rockets, naval mines, aviation, and military industries.**

IRGC Naval Branch Facilities

- **The IRGC has numerous staging areas in such places and has organized its Basij militia among the local inhabitants to undertake support operations.**
- **The naval branch has bases and contingency facilities in the Gulf, many near key shipping channels and some near the Strait of Hormuz.**
 - **These include facilities at Al-Farsiya, Halul (an oil platform), Sirri, Abu Musa, Bandaer-e Abbas, Khorramshahr, and Larak.**
- **Iran recently started constructing new naval bases along the coasts of the Gulf and the Sea of Oman for an “impenetrable line of defense.”**
- **On October 27, 2008, Iran opened a new naval base at Jask, located at the southern mouth of the Strait of Hormuz, a strategic chokepoint for Persian Gulf oil.**

Expanding Mission

- **Iran's Deputy Army Commander Brigadier General Abdolrahim Moussavi has announced that Iran is commitment to expanding its strategic reach, arguing that, "In the past, our military had to brace itself for countering regional enemies. This is while today we are faced with extra-regional threats."**
- **Iran upgraded a naval base at Assalouyeh in Iran's southern Bushehr province.**
 - **This base is the fourth in a string of IRGC bases along the waterway that will extend from Bandar Abbas to Pasa Bandar near the Pakistan border.**
 - **Part of, what IRGC's Navy Commander Rear Admiral Morteza Saffari describes as a new mission to establish an impenetrable line of defense at the entrance to the Sea of Oman.**

Expanding Capabilities - I

- **Forces can carry out extensive raids against Gulf shipping, carry out regular amphibious exercises with the land branch of the IRGC against objectives like the islands in the Gulf, and could conduct raids against countries on the southern Gulf coast.**
- **Iran could launch a coordinated attack involving explosives-laden remote-controlled boats, swarming speedboats, semi-submersible torpedo boats, FACs, kamikaze UAVs, midget and attack submarines, and shore-based anti-ship missile and artillery fire.**
- **Could “swarm” a U.S.-escorted convoy or surface action group transiting the Strait of Hormuz, and barrages of rockets with cluster warheads could be used to suppress enemy defensive fire and carrier air operations.**
- **Naval Guards work closely with Iranian intelligence and appear to be represented unofficially in some embassies, Iranian businesses and purchasing offices, and other foreign fronts.**

Expanding Capabilities – II

Domestic Weapons Procurement

Iran has launched a domestic weapons procurement campaign aimed at improving its defense capabilities and has announced the development of upwards of 109 types of advanced military equipment over the past two years.

- In December 2008 Iranian Navy Rear Admiral Habibollah Sayyari confirmed the delivery of two new domestically-built missile boats, Kalat (Fortress) and Derafsh (Flag), as well as a Ghadir-class light submarine to the Iranian navy.**
- The deputy commander of the IRGC's navy, Rear Admiral Ali Fadavi, told the Fars News Agency on 11 November 2008 that both unmanned speedboats and UAVs are now mass-produced in the country.**
- On December 6, 2008 the Iranian Navy test-fired a new surface-to-surface missile from a warship as part of exercises along a strategic shipping route. "The Nasr-2 was fired from a warship and hit its target at a distance of 30 km (19 miles) and destroyed it," Iranian state run radio reported.**

Expanding Capabilities – III

Domestic Weapons Procurement

- **On March 8, 2009 Iranian officials reported "successfully" testing a new air-to-sea missile with a range of 110 kilometers (68 miles), the Fars news agency reported stating that "Iranian defense specialists are able to successfully install missiles with a range of 110 kilometers on fighter planes and launch them." The report also stated that the latest test showed the Islamic republic's "ability to automatically direct the missile and carry warheads to destroy large targets at sea."**
- **Iran in May 2009 inaugurated a production line for a military hovercraft, dubbed the Younes 6. Meanwhile, Iran announced the military production of some 20 other military devices, including laser systems and electronic warfare devices. Production also began on a 40mm anti-cruise cannon dubbed Fath, which is capable of reaching targets as far as 7 miles away with a firing rate of 300 rounds per minute.**
- **On June 1, 2009 the Iranian Defense Ministry's launching of three new Ghadir-class submarines for its naval fleet (bringing the total number of the sonar-evading vessels to seven) and 18 speedboats at the port of Bandar Abbas near the Straits of Hormuz. The Ghadir class is a smaller vessel with a displacement of around 120 tons. The semiofficial Fars News Agency in 2007 said the Ghadir class was equipped with stealth technology.**
- **On June 6, 2009 Iran started production of a new ground-to-air missile system, Iranian media, amid persistent speculation that Israel might attack the Islamic Republic's nuclear facilities. "The range of this defense system (missile) is more than 40 km and it is able to pursue and hit the enemy's airplanes and helicopters on a smart basis and at supersonic speed," Defence Minister Mostafa Mohammad Najjar said, without specifying how the missile compared to previous such weapons.**

Iranian Asymmetric Doctrine

- Iran sends signals about its use of asymmetric warfare through its military parades and exercises.
- The IRGC often claims to conduct very large exercises, sometimes with 100,000 men or more. The exact size of such exercises is unclear, but they are often a small fraction of IRGC claims.
- One important aspect of the exercise was the almost total absence of the regular Iranian navy, whose functions are more oriented towards the classical tasks of sea denial and power projection ashore in the Gulf and the Straits of Hormuz.
- By displaying both its real and virtual military (e.g. naval) fighting capabilities through electronic, printed and network media, and through endless official statements, Iran tends to achieve the following politico-diplomatic and propaganda ends (4Ds):
 - Defiance (to maintain a course of resistance, targeting primarily the Western political will and system).
 - Deception (on the real state of Iranian warfighting capabilities, targeting the Western military establishments).
 - Deterrence (with the IRI military “might”, targeting Western public opinion, delivered through the media).
 - Demonstration (of the outreach of its own power, targeting the Iranian people and the Moslem world).

IRGC Commander and Asymmetric Strategy - I

- **On September 1, 2007, Khamenei promoted Mohammad Ali Jafari, then coordinator of the IRGC Research and Command Center, to the rank of major general and the post of commander in chief of the IRGC.**
- **Throughout his military career Jafari has emphasized asymmetrical warfare and developing Iran's ballistic missile capabilities throughout his military career**
- **In 1992, he was appointed commander of the ground forces. One of the tasks he carried out in this capacity was "to study and assess the strengths and weaknesses of America [as reflected] in its attacks on Afghanistan and Iraq."**
- **Jafari has outlined the strategy he means to promote as IRGC commander, reiterating his commitment to developing Iran's ballistic missile capabilities and the asymmetrical warfare capacities of the IRGC:**
 - **Asymmetrical warfare... is [our] strategy for dealing with the considerable capabilities of the enemy. A prominent example of this kind of warfare was [the tactics employed by Hizbullah during] the Lebanon war in 2006... Since the enemy has considerable technological abilities, and since we are still at a disadvantage in comparison, despite the progress we have made in the area of equipment, [our only] way to confront [the enemy] successfully is to adopt the strategy [of asymmetric warfare] and to employ various methods of this kind."**

IRGC Commander and Asymmetric Strategy - II

• **IRGC commander Mohammad Ali Aziz Jafari statements on asymmetric strategy continued:**

- **Jafari has said in the past that, in the case of a confrontation with the West, Iran will be willing to employ the organizations under its influence. In a January 2005 speech to intelligence commanders from the Basij and IRGC, Jafari - then commander of the ground forces - stated: "In addition to its own capabilities, Iran also has excellent deterrence capabilities outside its [own borders], and if necessary it will utilize them."**
- **"the Revolutionary Guards [Corps] will invest efforts in strengthening its asymmetrical warfare capabilities, with the aim of successfully confronting the enemies."**
- **"After September 11, [2001], all [IRGC] forces changed their [mode of] operation, placing emphasis on attaining combat readiness. The first step [towards achieving] this goal was to develop [a strategy] of asymmetrical warfare and to hold maneuvers [in order to practice it]."**

Some Tangible Examples

- **Iranian tanker war with Iraq**
- **Oil spills and floating mines in Gulf.**
- **Libyan “stealth” mining of Red Sea.**
- **Use of Quds force in Iraq.**
- **Iranian use of UAVs in Iraq.**
- **“Incidents” in pilgrimage in Makkah.**
- **Support of Shi’ite groups in Bahrain.**
- **Missile and space tests; expanding range of missile programs (future nuclear test?).**
- **Naval guards seizure of British boat, confrontation with US Navy, exercises in Gulf.**
- **Development of limited “close the Gulf” capability.**
- **Flow of illegal's and smuggling across Yemeni border.**

Iranian Military Exercises: 2006-2009 - I

January 27, 2006: Iran completes major military exercise that tests Teheran's ability to attack Gulf shipping and Arab oil facilities. Sources said the exercise was designed to test capabilities to strike U.S. and Arab targets throughout the area of the Gulf. According to a diplomatic source, the exercise was meant to show the West that Iran could stop all oil shipments in the Gulf and destroy numerous oil facilities in Gulf Arab countries," and included a range of fighter-jets and helicopters from the Iranian Air Force, with the Iranian navy contributed surface vessels and submarines.

August 19, 2006: Iran launches a series of large-scale military exercises aimed at introducing the country's new defensive doctrine, state-run television reported. The television report said the military exercise would occur in 14 of the country's 30 provinces and could last as long as five weeks. The first stage of the maneuvers began with air strikes in the southeastern province of Sistan va Baluchistan,. The military exercise, is said to involve 12 infantry regiments, and is called "The Blow of Zolfaghar," in reference to a sword that belonged to Imam Ali, one of the most revered figures for Shi'ite Muslims.

November 3, 2006: Iran's Revolutionary Guards began another series exercises on days after a United States-led naval exercise began in the Gulf. Iran began the 10 days of maneuvers in the Gulf by test firing dozens of missiles, including the long-range Shahab-3 (estimated range: 2000 km or 1,240 miles), and the Shahab-2, which Iran says can carry a cluster warhead that can deliver 1,400 bomblets at once. Major General Yahya Rahim Safavi, leader of the Revolutionary Guards, says on television that Iran's military exercises were not meant to threaten neighboring countries. "We want to show our deterrent and defensive power to trans-regional enemies, and we hope they will understand the message of the maneuvers," he said. "The first and main goal is to demonstrate the power and national determination to defend the country against possible threat." General Safavi said the exercises would last 10 days and would take place in the Gulf, the Gulf of Oman and several Iranian provinces.

Iranian Military Exercises: 2006-2009- II

March 23-30 2007: Iran's regular Navy launches week-long war-games on its southern shores. The military exercises are being carried out in the Gulf by Iran's regular Navy, the report said, adding that they would continue until March 30.

January 7, 2008: US ships harassed by Iran. Iranian boats approach three U.S. Navy ships in the strategic Strait of Hormuz, threatening to explode the American vessels. U.S. forces are reported to be on the verge of firing on the Iranian boats, when the boats - believed to be from the Iranian Revolutionary Guard's navy - turn and move away. A Pentagon official say. "It is the most serious provocation of this sort that we've seen yet," He says the incident occurs at about 5 a.m. local time Sunday as Navy cruiser USS Port Royal, destroyer USS Hopper and frigate USS Ingraham were on their way into the Gulf and passing through the strait - a major oil shipping route. to take evasive maneuvers. There were no injuries but the official said there could have been, because the Iranian boats turned away "literally at the very moment that U.S. forces were preparing to open fire" in self defense.

July 7, 2008: Iran's elite Islamic Revolutionary Guards Corps launch large-scale, five-day war-games, dubbed "Exercise Stake Net", was carried out in the Straits of Hormuz and the Sea of Oman, where an assortment of new weapons were brought into play. The Iranian military maneuvers take place on the same day the United States announces it too will holding naval exercises in the Gulf.

Iranian state media say that the military maneuvers by the IRGC's Navy and Air Force missiles unit are aimed at improving the force's military abilities. Separately, Brigadier General Mahmoud Chaharbaghi, commander of the IRGC Ground Forces artillery and missiles unit, announces that 50 of his unit's brigades are being armed with smart weapons and cluster bombs. Iran later test-fires nine missiles including what is claims is an upgraded version of Shahab-3 ballistic missile with a one-ton warhead capable of destroying targets within a 2,000-kilometer (1,245-mile) range

Iranian Military Exercises: 2006-2009 - III

September 7, 2008: Iran's armed forces test the country's new weapons systems and defense plans in a three-day military maneuver. Iran's naval forces claim to have made a breakthrough in building various types of "radar evading" submarines to guard its territorial waters. The IRGC says it successfully test-fired advanced shore-to-sea, surface-to-surface and sea-to-air missiles. The Islamic Revolution Guards Corp (IRGC) and the Army take part in drills involving anti-aircraft defense systems. The main purpose of the maneuvers is to maintain and promote the combat readiness of relevant units and to test new weapons and defense plans. Iran's Chief Navy Commander, Rear Admiral Habibollah Sayyari, said Iran is upgrading its naval fleet with a new generation of domestically-built submarines.

September 15, 2008: The Islamic Republic Air Force tests Iran's domestic-made warfare in a joint military exercise with the IRGC, the Defense Ministry says. The joint aerial maneuver is aimed at boosting Iran's defensive capabilities and operational tactics, Iran's Defense Minister Brigadier General Mostafa Mohammad-Najjar say. The military exercise, which involves The Islamic Republic of Iran Air Force (IRIAF) and the Islamic Revolution Guards Corps (IRGC), comes in the wake of escalating US and Israeli threats to strike the country's nuclear facilities.

October 10, 2008: Islamist militiamen affiliated to Iran's Islamic Revolutionary Guards Corps (IRGC) stage military exercises in the suburbs of Tehran on Friday to defend the Iranian capital against "natural disasters" and "enemy assaults". Members of the paramilitary Basij take part in military drills under the command of the Tharallah Garrison in Tehran. Similar war games are held in Karaj, Islamshahr, Shahre Rey, Rabat Karim, and Varamin, said the acting deputy commandant of the IRGC, Brigadier General Mohammad Hejazi, who also commands the Tharallah Garrison. The maneuvers last for 48 hours. Meanwhile another senior Basij leader announces that the paramilitary force is giving specialized training" to its units across Iran. "These units are receiving specialized air, sea and ground training to be prepared for defending the country, the ruling establishment, and the revolution", said Brigadier General Ahmad Zolqadr on the sidelines of a military parade in Zanjan, north-west Iran. Zolqadr is the operational commander of the Basij.

Iranian Military Exercises: 2006-2009 - IV

November 12, 2008: Iran launches a “new” type of long-range ballistic missile dubbed "Sajeel," but its general layout was indistinguishable from the description of the "Ashura," which was flight-tested about one year ago.

December 2-7, 2008: Iran announces recent upgrades to the Naval Base in Asalouyeh and the now online base facilities in the port of Jask. Iranian officers state that long range tactical missile silos and shore based anti-ship missiles have long been key aspects of planning of potential military operations in the event of an open conflict. Top Iranian Army commander Major General Ayatollah Saleh is quoted in *Presstv Nov 30* as saying "the heavy weight of the enemy warships provides the Iranian side with an ideal opportunity for launching successful counter-attacks" Iran announces that it is in the final stages of planning an extensive naval and military exercise 'Unity 87' due to commence in December 2008. Iran says it will seek to accomplish objectives that include include defense against a Israeli and US threat, closing the Strait of Hormuz to local and international shipping, and the testing new and improved military equipment and tactics.

Admiral Qasem Rostamabadi tells states radio that "The aim of this maneuver is to increase the level of readiness of Iran's naval forces and also to test and to use domestically-made naval weaponry." He says the naval maneuvers cover an area of 50,000 square miles, including the Sea of Oman off Iran's southern coast. "In this six-day long maneuver there will be more than 60 combat vessel units," Kayhan quotes Admiral Habibollah Sayyari, commander of the navy as saying it will include destroyers, missile-equipped battleships, submarines, special-operations teams, helicopters, and fighter planes. Iran has previously claimed it could close the Strait of Hormuz to shipping, through which about 40 percent of the world's globally traded oil passes. The United States has pledged to protect shipping routes. An Iranian naval commander says a week earlier that the country's navy could strike an enemy well beyond its shores and as far away as Bab al-Mandab, the southern entrance to the Red Sea that leads to the Suez Canal. Iran test-fires a new surface-to-surface missile from a warship in a strategic shipping route, as part of the war games in the Sea of Oman and the Gulf region: State radio reports, "The surface-to-surface Nasr-2 missile was tested in the (Sea of) Oman operational region,". IRNA reports that, "The Nasr-2 was fired from a warship and hit its target at a distance of 30 km (19 miles) and destroyed it," adding it was the first test of the new, medium-range missile.

Iranian Military Exercises: 2006-2009 - V

Mach 8, 2009: Iranian officials reported "successfully" testing a new air-to-sea missile with a range of 110 kilometers (68 miles), the Fars news agency reported. "Iranian defense specialists are able to successfully install missiles with a range of 110 kilometers on fighter planes and launch them," the report said, adding that the high-precision weapon weighs about 500 kilos. The report said the latest test showed the Islamic republic's "ability to automatically direct the missile and carry warheads to destroy large targets at sea."

May 20, 2009: Iran test-fired a solid-fuel missile capable of reaching Israel or US bases in the Middle East. Iranian officials claim that the two-stage, solid-fuel Sajjil-2 surface-to-surface missile has a range of approximately 2,000km (1,240 miles). Iranian Defense Minister Mostafa Mohammad Najjar, claimed that in addition to the increase in range, the Sajjil-2 differs from the Sajjil missile launched in November 2008, because it "is equipped with a new navigation system as well as precise and sophisticated sensors," according to Iran's official news agency, and added that the missile landed "precisely on the target."

Reports also indicate that the Sajjil-2's reaction times may be about 50-20 minutes faster than the Shahab series that came before it. Its solid fuel booster may also be is also reliable, particularly in a mobile basing; and has less need for maintenance. Its mobility launcher might also be harder to detect since the TEL requires fewer support vehicles -- although the Shahab does use storable liquid fuels and the difference is might not be a serious as some sources indicate.

May 26, 2009: Iran sent six warships into international waters including the Gulf of Aden, a local newspaper reported, just days after it test-fired its Sajjil -2 missile. "We have dispatched six warships to international waters and the Gulf of Aden," naval commander Habibollah Sayari was quoted as saying in the Jomhuri Eslami. "This mission shows our increased capability in dealing with any foreign threat," he said. Iranian officials said on May 14 that the Islamic republic had dispatched two warships to the Gulf of Aden but it was unclear whether they were among the six announced by Sayari.

Iranian Military Exercises: 2006-2009 - VI

June 1, 2009: The Iranian air force has launched a large military exercise dubbed "Thunder 88" over its regional waters, official media indicated. Iranian TV said the Air Force carried out maneuvers using various types of combat aircraft, a move that coincided with the Defense Ministry's launching of three new Ghadir-class submarines for its naval fleet (bringing the total number of the sonar-evading vessels to seven) and 18 speedboats at the port of Bandar Abbas near the Straits of Hormuz, the Kuwait news agency KUNA reported. Officials said the exercises are meant to enhance the Iranian Air Force's capabilities and to train them to safeguard navy ships. Iran's Mehr news agency said the Bandar Abbas ceremony was attended by Army Commander Ataollah Salehi and Defense Minister Mostafa-Mohammad Najjar, KUNA reported.

The Ghadir class is a smaller vessel with a displacement of around 120 tons. The semiofficial Fars News Agency in 2007 said the Ghadir class was equipped with stealth technology. The news comes amid a flurry of Iranian defense activity. Iran in May inaugurated a production line for a military hovercraft, dubbed the Younes 6. Meanwhile, Iran announced the military production of some 20 other military devices, including laser systems and electronic warfare devices. Production also began on a 40mm anti-cruise cannon dubbed Fath, which is capable of reaching targets as far as 7 miles away with a firing rate of 300 rounds per minute. The Sejjil-2 surface-to-surface solid-fuel missile, meanwhile, was launched in May with a range capable of reaching Israel.

June 6, 2009: Iran has started production of a new ground-to-air missile system, Iranian media, amid persistent speculation that Israel might attack the Islamic Republic's nuclear facilities. "The range of this defense system (missile) is more than 40 km and it is able to pursue and hit the enemy's airplanes and helicopters on a smart basis and at supersonic speed," Defence Minister Mostafa Mohammad Najjar said, without specifying how the missile compared to previous such weapons.

June 22, 2009: Iran began three days of air force exercises on in the Gulf and the Sea of Oman to raise operational and support capability, Iranian media said. "Long-distance flights of around 3,600 km (2,237 miles) along with aerial refueling from tanker to fighter jet and from fighter jet to fighter jet will be part of this exercise," state broadcaster IRIB's website reported. "Low altitude flights over the waters of the ... Gulf and the Sea of Oman by Iranian fighter jets over distances of 700 km will also be tested.," it said. IRIB reported that the exercises were also aimed at raising the force's ability to use intelligence aircraft "to send signals and analyze threats".

The Broader Patterns in Iranian Activity

Iranian Actors	Related States/ Non-State Actors	Target/Operating Country
Revolutionary Guards	Iran	Iraq
Al Qaeda force	Syria	Israel
Vevak/other intelligence	Hezbollah	Egypt
Arms transfers	Hamas	Kuwait
Military and security advisors	Mahdi Army	Bahrain
Clerics, pilgrims, shrines	Yemeni Shi'ites	Yemen
Commercial training	Bahraini Shi'ites	Lebanon
Finance/investment	Saudi Shi'ites	Afghanistan
Investment/training companies		Venezuela
Education: scholarships, teachers		
Cultural exchanges		
Athletic visits		

The Al Quds Force - I

- **Comprised of 5,000 - 15,000 members of the IRGC (Increased size of force in 2007)**
- **Equivalent of one Special Forces division, plus additional smaller units**
- **Special priority in terms of training and equipment**
- **Plays a major role in giving Iran the ability to conduct unconventional warfare overseas using various foreign movements as proxies**
- **Specialize in unconventional warfare mission**
- **Control many of Iran's training camps for unconventional warfare, extremists, and terrorists**
- **Has offices or "sections" in many Iranian embassies throughout the world**
- **Through its Quds Force, Iran provides aid to Palestinian terrorist groups such as Hamas, Lebanese Hizballah, Iraq-based militants, and Taliban fighters in Afghanistan.**
- **Despite its pledge to support the stabilization of Iraq, Iranian authorities continued to provide lethal support, including weapons, training, funding, and guidance through its Quds Force.**
- **General David H. Petraeus has stressed the growing role of the Quds force and IRGC in statements and testimony to Congress.**

The Al Quds Force - II

- Quds Force continue to provide Iraqi and Afghani militants with:
 - specialized training,
 - funding,
 - Iranian-produced advanced rockets,
 - sniper rifles,
 - automatic weapons,
 - mortars ,
 - Improvised Explosive Devices (IEDs)
 - and explosively formed projectiles (EFPs) that have a higher lethality rate than other types of IEDs
- Since 2006, Iran has arranged a number of shipments of small arms and associated ammunition, rocket propelled grenades, mortar rounds, 107mm rockets, and plastic explosives, possibly including man-portable air defense systems (MANPADs), to the Taliban.
- Israeli defense experts continue to state that they believe the IRGC and Quds force not only played a major role in training and equipping Hezbollah, but may have assisted it during the Israeli-Hezbollah War in 2006, and played a major role in the Hezbollah anti-ship missile attack on an Israeli Navy Sa'ar-class missile patrol boat.

Iran and Hezbollah - I

- Hezbollah was originally formed in 1982 by Iranian seminarians.
- Iran's aid packages (arms and money) to Hezbollah are said to exceed \$100 million per year.
- Iran has gone from supplying small arms, short-range missiles and training to providing more sophisticated long-range missiles and other higher-end weaponry
 - Iran exported thousands of 122-mm rockets and Fajr-4 and Fajr-5 long-range rockets to Hezbollah in Lebanon, including the Arash with a range of 21–29 kilometers.
 - Between 1992 and 2005, Hezbollah received approximately 11,500 missiles and rockets; 400 short- and medium-range pieces of artillery; and Aresh, Nuri, and Hadid rockets and transporters/launchers from Iran.
 - In 2005, Iran sent Hezbollah a shipment of large Uqab missiles with 333-millimeter warheads and an enormous supply of SA-7 and C-802 missiles, two of which were used in an attack on an Israeli ship.
- Iran also supplied Hezbollah with an unknown number of UAV's, the *Mirsad*, that Hezbollah briefly flew over the Israel-Lebanon border on November 7, 2004, and April 11, 2005; at least three were shot down by Israel during the summer 2006 war.
- Iran supplied Hezbollah advanced surface-to-air missiles, including Strela-2/2M, Strela-3, Igla-1E, and the Mithaq-1. The same missiles were reported to have been used to target Israeli helicopters.

Iran and Hezbollah - II

- **During Hezbollah's summer 2006 war with Israel, Iran resupplied the group's depleted weapons stocks.**
- **Hezbollah has recovered from its 2006 confrontation with Israel and has been able to rearm and regroup, and Iran has been an important part of that recovery.**
 - **Various Types of Rockets, reportedly increasing its stockpile to 27,000 rockets, more than double what Hezbollah had at the start of the 2006 war.**
 - **Among the deliveries were 500 Iranian-made "Zelzal" (Earthquake) missiles with a range of 186 miles, enough to reach Tel Aviv from south Lebanon.**
- **Fighting in Lebanon in 2006 seems to have increased Hezbollah's dependence on Iran. Both Hezbollah's loss of weapons and fighters in the conflict with Israel and the resulting damage to its reputation and position within Lebanon made it more reliant upon Iran.**
- **Elements of Hezbollah planned attacks in Egyptian Sinai; operate in Iraq**

Source Multiple news outlets and Congressional reports and Intelligence assessments including: "Israel's Peres Says Iran Arming Hizbollah." Reuters, February 4, 2002; Kenneth Katzman, Iran: U.S. Concerns and Policy Responses, Congressional Research Service Report for Congress RL32048, April 14, 2009, available at: <http://www.fas.org/sgp/crs/mideast/RL32048.pdf>; Robin Hughes, "Iran Answers Hizbullah Call for SAM Systems," Jane's Defence Weekly, August 7, 2006, available at: www.janes.com/defence/news/jdw/jdw060807_1_n.shtml; Rotella, Sebastian. "In Lebanon, Hezbollah Arms Stockpile Bigger, Deadlier." Los Angeles Times, May 4, 2008; Shadid, Anthony. "Armed With Iran's Millions, Fighters Turn to Rebuilding." Washington Post, August 16, 2006; MEMRI, "Iran and the Recent Escalation on Israel's Borders Reaction in Iran, Lebanon, and Syria," Special Dispatch Series no. 1207, July 17, 2006, available at: www.memri.org/bin/articles.cgi?Page=archives&Area=sd&ID=SP120706; Ali Nouri Zadeh, "130 Officers from the Iranian Revolutionary Guard Corps and Quds Force Aid Hezbollah: 11,500 Missiles and Rocket-Propelled Grenades Sent from Tehran to Hezbollah," Asharq Al-Awsat, July 16, 2006, available at: www.aawsat.com/details.asp?section=4&issue=10092&article=373305&search=C802&state=true; "New Iranian capability is troublesome," The Washington Times, 19 February 2009; The Israel Project, "Hezbollah, Hamas Rearm as Israel Works to Resume Peace Process," press release, February 22, 2007, available at: www.theisraelproject.org/site/apps/nl/content2.asp?c=hsJPK0PIJpH&b=689705&ct=3601455, etc.

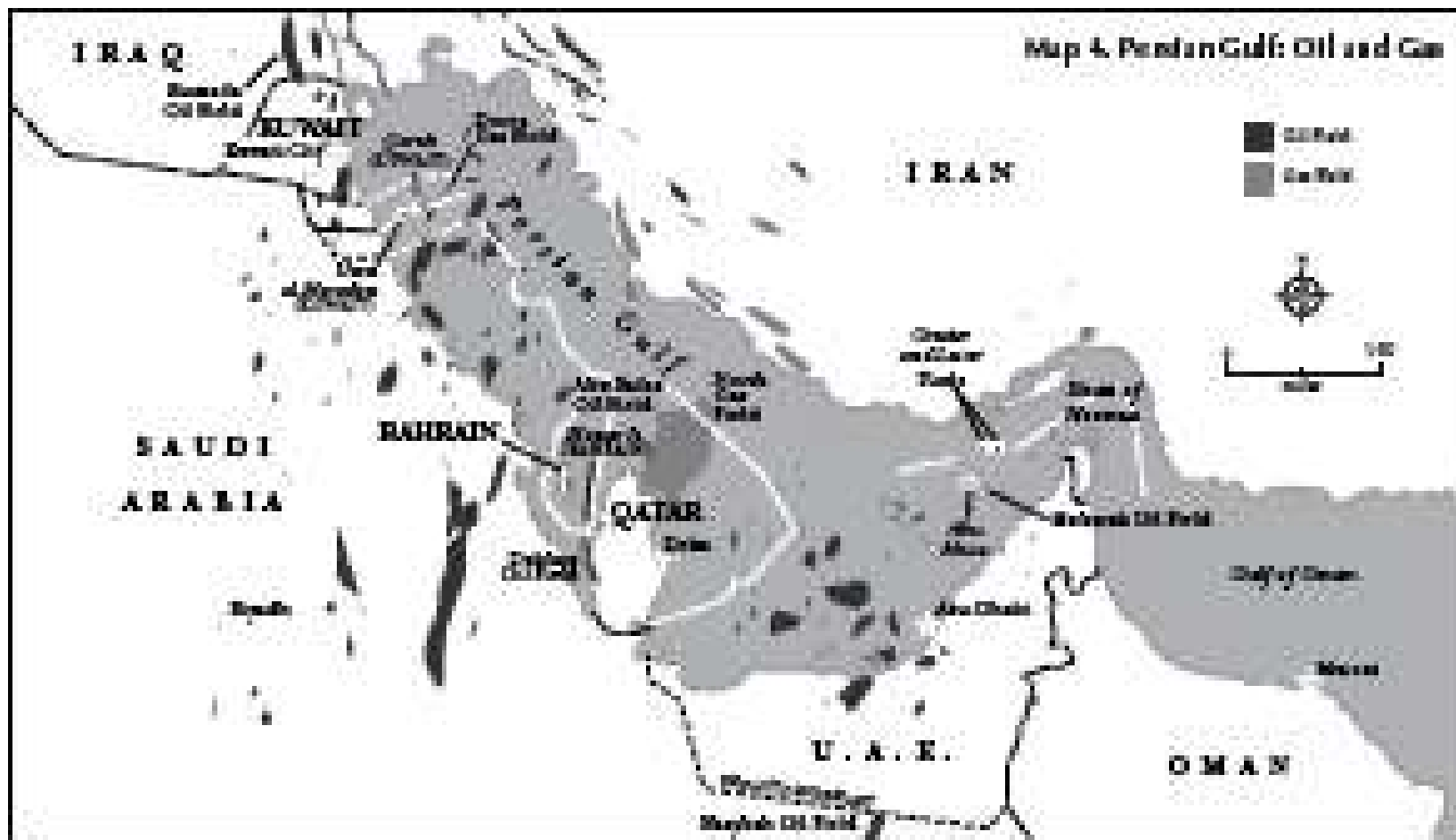
Iran and Hamas

- **Iran openly supported Hamas and spoke out against the lack of support for Hamas by Arab regimes throughout the Middle East during engagements between the IAF and Hamas in late 2008 and early 2009 in Gaza.**
- **Iran provided training, arms and logistical support to Hamas during the fighting in Gaza between Israeli forces and Hamas militants in late December 2008 and early January 2009.**
- **Israeli intelligence sources continued to report Iranian efforts to rearm Hamas after a ceasefire agreement was reached in January 2009.**
- **Arms transfers come through Sudan and Sinai.**
- **Level of Iranian financial support uncertain.**

The Gulf



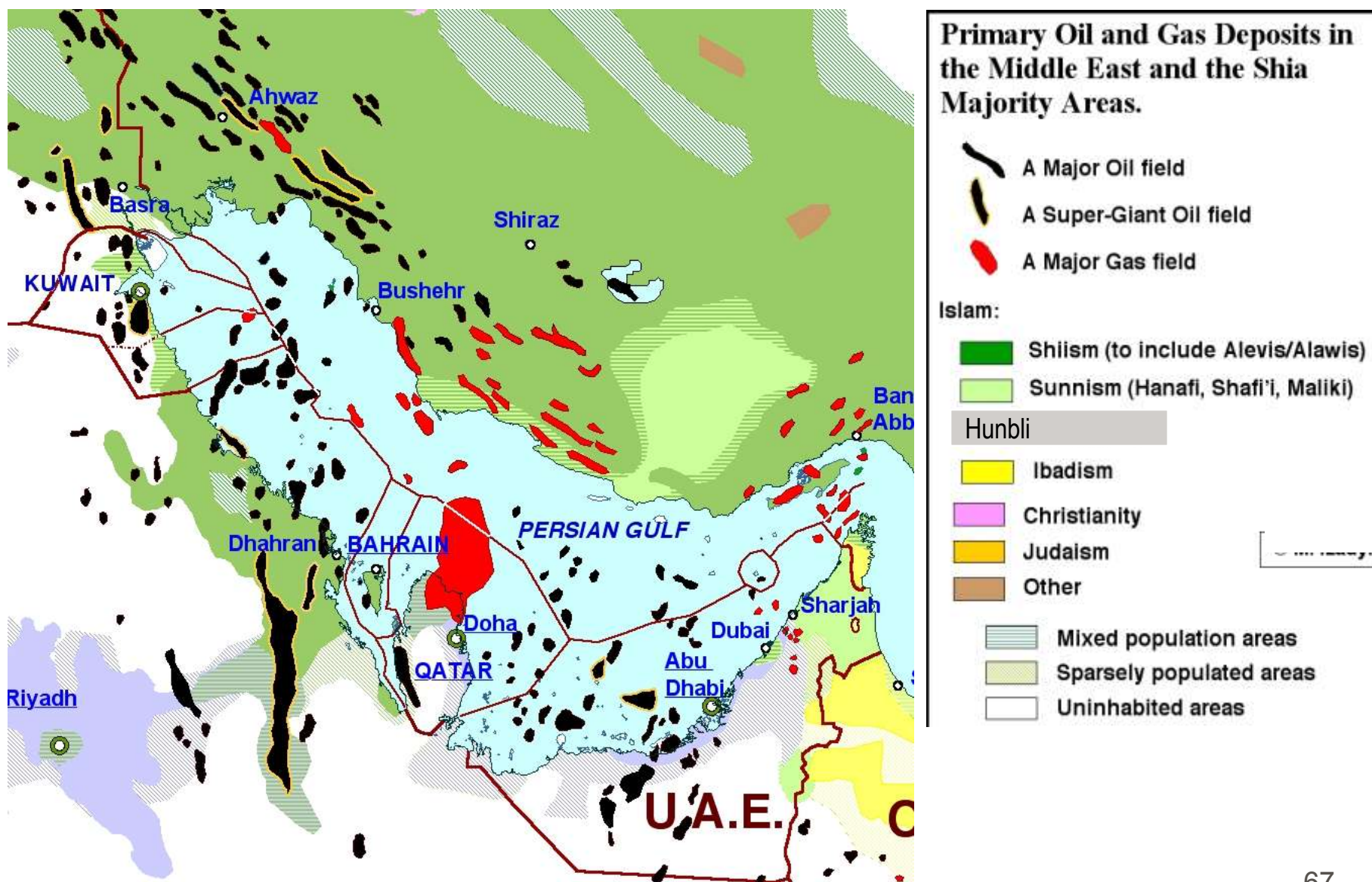
Gulf Oil Fields



The Entire Gulf: Breaking the Bottle at Any Point



Vulnerability of Gulf Oil Fields



Hormuz: Breaking the Bottle at the Neck



- 280 km long, 50 km wide at narrowest point.
- Traffic lane 9.6 km wide, including two 3.2 km wide traffic lanes, one inbound and one outbound, separated by a 3.2 km wide separation median
- Antiship missiles now have ranges up to 150 km.
- Smart mines, guided/smart torpedoes,
- Floating mines, small boat raids, harassment.
- Covert as well as overt sensors.

Strait of Hormuz-Imagery



Key Gulf-Related Chokepoints - I

Important World Oil Transit Chokepoints						
Name	2006E oil flow (bbl/d)	Width at Narrowest Point	Oil Source Origin	Primary Destination	Past Disturbances	Alternative Routes
The Strait of Hormuz	16.5-17 million	21 miles	Persian Gulf Nations including Saudi Arabia, Iran, and UAE	Japan, The United States, Western Europe, other Asian countries	Sea mines were installed during the Iran-Iraq War in the 1980s. Terrorists threats post September 11, 2001.	745-mile long East-West Pipeline through Saudi Arabia to the Red Sea
The Suez Canal/ Sumed Pipeline	4.5 million	1,000 feet	Persian Gulf Nations, especially Saudi Arabia, and Asia	Europe and The United States	Suez Canal was closed for eight years after the Six-Day War in 1967. Two large oil tankers ran aground in 2007 suspending traffic.	Reroute around the southern tip of Africa (the Cape of Good Hope); additional 6,000 miles.

Key Gulf-Related Chokepoints - II

Important World Oil Transit Chokepoints						
Name	2006E oil flow (bbl/d)	Width at Narrowest Point	Oil Source Origin	Primary Destination	Past Disturbances	Alternative Routes
Bab el-Mandab	3.3 million	18 miles	The Persian Gulf	Europe and The United States	USS Cole attack in 2000; French oil tanker in 2002, both attacks off the coast of Aden, Yemen	Northbound traffic can use the East-West oil pipeline through Saudi Arabia; Reroute around the southern tip of Africa (the Cape of Good Hope), additional 6,000 miles.
The Turkish Straits	2.4 million	0.5 mile	Caspian Sea Region	Western and Southern Europe	Numerous past shipping accidents due to the straits sinuous geography. Some terrorist threats were made after September 11, 2001.	No clear alternative; potential pipelines discussed including a 173-mile pipeline between Russia, Bulgaria, and Greece.

Abu Musa, Tumbs, Hormuz: Factoids

- **34 miles (55 KM) wide at narrowest part.**
- **Channels consist of 2-mile (3.2 km) navigable channels for inbound and outbound traffic, separated by 2-mile wide buffer zone.**
- **40% of all globally traded oil supply.**
- **75%-plus of Japan's oil/**
- **13.4 MMBD of crude through Strait in May 2007**
- **Additional 2 MMBD of products and over 31 million tons of LNG.**
- **90% of all Gulf exports go through Strait.**
- **EIA predicts exports will double to 30-34 MMBD by 2020**
- **Gulf will export 40% of world's LNG by 2015.**

“Closing the Gulf”

- **3 Kilo (Type 877) and unknown number of midget (Qadr-SS-3) submarines; smart torpedoes, (anti-ship missiles?) and smart mine capability.**
- **Use of 5 minelayers, amphibious ships, small craft, commercial boats.**
- **Attacks on tankers, shipping, offshore facilities by naval guards.**
- **Raids with 8 P-3MP/P-3F Orion MPA and combat aircraft with anti-ship missiles:(C-801K (8-42 km), CSS-N-4, and others).**
- **Free-floating mines, smart and dumb mines, oil spills.**
- **Land-based, long-range anti-ship missiles based on land, islands (Seersucker HY-2, CSS-C-3), and ships (CSS-N-4, and others). Sunburn?**
- **IRGC raids on key export facility(ties).**

The Bab El Mandab



• **3.3 MMBD per day with 25%+ growth over next decade.**

• **2.1 MMBD flows northbound through Suez Complex.**

• **18 miles wide with two 2 mile channels going each way.**

• **Only major bypass is Saudi East-West pipeline at 4.4 MMBD, but now fully used.**

Source: EIA, Country Briefs, World Oil Transit Chokepoints, January 2008

Suez



Source: EIA, Country Briefs, World Oil Transit Chokepoints, January 2008

- An estimated 3.9 million bbl/d of oil flows northbound through the Suez Canal to the Mediterranean, while 0.6 million bbl/d travels southbound into the Red Sea.
- Over 3,000 oil tankers pass through the Suez Canal annually. With only 1,000 feet at its narrowest point, the Canal is unable to handle large tankers.
- Suez Canal Authority (SCA) has discussed widening and deepening to accommodate VLCCs and ULCCs.
- 200-mile long Sumed Pipeline, or Suez-Mediterranean Pipeline also provides a route by crossing the northern region of Egypt from the Ain Sukhna to the Sidi Kerir Terminal.
- The pipeline can transport 3.1 million bbl/d of crude oil., Nearly all of Saudi Arabia's northbound shipments (approximately 2.3 million bbl/d of crude) are transported through the Sumed pipeline.
- Closure would divert tankers around the southern tip of Africa, the Cape of Good Hope, adding 6,000 miles to transit time.

Planning for Asymmetric Warfare

- **Deterrence and conflict prevention as critical as defense.**
- **Need integrated GCC force planning and war planning efforts.**
- **Must show GCC will act together. Threats cannot divide or exploit weakest link.**
- **Exercise realistic “red-blue” war games to determine common options and requirements.**
- **Follow-up with realistic CPXs and FTXs.**
- **Emphasize joint warfare approaches that tie in paramilitary and security forces.**
- **Demonstrate have exercised a retaliatory capability.**
- **Interoperability with other Gulf states and with US, UK, France.**
- **Defend against strikes at critical nodes and infrastructure.**

Iranian Missiles and Proliferation

Nuclear Uncertainty

- **Must plan to deal with possible Iranian force with unknown weapons characteristics, delivery systems, basing, and timelines.**
 - **Technology base now exists, enrichment to fissile levels is only limiting factor.**
- **Already a key factor in Iranian capability to conduct “wars of intimidation.”**
- **Clear Iran proceeding with extensive ballistic missile program regardless of whether it pursues the nuclear option.**
- **Cannot predict timeframe for nuclear threat. Worst case is 2009, but could well be 2015.**
- **Chemical and biological options as well.**

Confusion Over the US NIE

- **Not say Iran was not moving towards nuclear weapon.**
 - **Did say evidence that halted formal efforts at weapons development in 2003. (When US “victories” in Iraq and Afghanistan seemed most threatening to Iran,**
 - **Made it clear that Iran was pursuing enrichment technology that was the sole remaining barrier to Iran acquiring nuclear weapons.**
- **Since NIE was issued, new evidence has surfaced of weapons development efforts beyond initial “laptop” and “Green Salt” disclosures.**
- **Iran has also been discovered to have completed development of a new, far more advanced centrifuge.**
- **Iran has announced two new long-range missiles, and a “space” program that can be adapted to missile development.**

DNI's March 2008 Summary - I

Over the past year we have gained important new insights into **Tehran's** activities related to nuclear weapons and the Community recently published a National Intelligence Estimate on Iranian intent and capabilities in this area. I want to be very clear in addressing the Iranian nuclear capability. First, there are three parts to an effective nuclear weapons capability:

1. Production of fissile material
2. Effective means for weapons delivery
3. Design and weaponization of the warhead itself

We assess in our recent NIE on this subject that warhead design and weaponization were halted, along with covert military uranium conversion- and enrichment-related activities. Declared uranium enrichment efforts, which will enable the production of fissile material, continue. This is the most difficult challenge in nuclear production. Iran's efforts to perfect ballistic missiles that can reach North Africa and Europe also continue.

We remain concerned about Iran's intentions and assess with moderate-to-high confidence that Tehran at a minimum is keeping open the option to develop nuclear weapons. We have high confidence that Iranian military entities were working under government direction to develop nuclear weapons until fall 2003. Also, Iranian entities are continuing to develop a range of technical capabilities that could be applied to producing nuclear weapons. Iran continues its efforts to develop uranium enrichment technology, which can be used both for power reactor fuel and to produce nuclear weapons. And, as noted, Iran continues to deploy ballistic missiles inherently capable of delivering nuclear weapons, and to develop longer-range missiles. We also assess with high confidence that even after fall 2003 Iran has conducted research and development projects with commercial and conventional military applications—some of which would also be of limited use for nuclear weapons.

We judge with high confidence that in fall 2003, Tehran halted its nuclear weapons design and weaponization activities, as well as its covert military uranium conversion and enrichment-related activities, for at least several years. Because of intelligence gaps, DOE and the NIC assess with only moderate confidence that all such activities were halted. We assess with moderate confidence that Tehran had not restarted these activities as of mid-2007, but since they comprised an unannounced secret effort that Iran attempted to hide, we do not know if these activities have been restarted.

We judge with high confidence that the halt was directed primarily in response to increasing international scrutiny and pressure resulting from exposure of Iran's previously undeclared nuclear work. This indicates that Iran may be more susceptible to influence on the issue than we judged previously.

DNI's March 2008 Summary - II

We do not have sufficient intelligence information to judge confidently whether Tehran is willing to maintain the halt of its nuclear weapons design and weaponization activities indefinitely while it weighs its options, or whether it will or already has set specific deadlines or criteria that will prompt it to restart those activities. We assess with high confidence that Iran has the scientific, technical and industrial capacity eventually to produce nuclear weapons. In our judgment, only an Iranian political decision to abandon a nuclear weapons objective would plausibly keep Iran from eventually producing nuclear weapons—and such a decision is inherently reversible. I note again that two activities relevant to a nuclear weapons capability continue: uranium enrichment that will enable the production of fissile material and development of long-range ballistic missile systems.

We assess with moderate confidence that convincing the Iranian leadership to forgo the eventual development of nuclear weapons will be difficult given the linkage many within the leadership see between nuclear weapons development and Iran's key national security and foreign policy objectives, and given Iran's considerable effort from at least the late 1980s to 2003 to develop such weapons.

We continue to assess with moderate-to-high confidence that Iran does not currently have a nuclear weapon. We continue to assess with low confidence that Iran probably has imported at least some weapons-usable fissile material, but still judge with moderate-to-high confidence it has not obtained enough for a nuclear weapon. We cannot rule out that Iran has acquired from abroad—or will acquire in the future—a nuclear weapon or enough fissile material for a weapon. Barring such acquisitions, if Iran wants to have nuclear weapons it would need to produce sufficient amounts of fissile material indigenously—which we judge with high confidence it has not yet done.

Iran resumed its declared centrifuge enrichment activities in January 2006, despite the 2003 halt in its nuclear weapons design and weaponization activities. Iran made significant progress in 2007 installing centrifuges at Natanz, but we judge with moderate confidence it still faces significant technical problems operating them.

•We judge with moderate confidence that the earliest possible date Iran would be technically capable of producing enough highly enriched uranium (HEU) for a weapon is late 2009, but that is very unlikely.

•We judge with moderate confidence Iran probably would be technically capable of producing enough HEU for a weapon sometime during the 2010-2015 time frame. INR judges Iran is unlikely to achieve this capability before 2013 because of foreseeable technical and programmatic problems. All agencies recognize the possibility that this capability may not be attained until *after* 2015.

DNI's March 2008 Summary - III

We know that Tehran had a chemical warfare program prior to 1997, when it declared elements of its program. We assess that Tehran maintains dual-use facilities intended to produce CW agent in times of need and conducts research that may have offensive applications. We assess Iran maintains a capability to weaponize CW agents in a variety of delivery systems.

We assess that Iran has previously conducted offensive BW agent research and development. Iran continues to seek dual- use technologies that could be used for biological warfare.

Extract from J. Michael McConnell, Director of National Intelligence, "Annual Threat Assessment of the Intelligence Community for the Senate Armed Services Committee," 27 February 2008

ISIS Report: Misconceptions about Iran's Nuclear Program - I

1. Iran's IAEA safeguards violations were minor breaches and fully in the past

- Iran's violation of its obligations under the verification requirements of the Nuclear NPT is one of most significant breaches of this treaty.
- Iran's safeguards violations have been detailed in numerous IAEA reports starting in 2003
- November 2003: Iran has failed in a number of instances over an extended period of time to meet its obligations under its Safeguards Agreement with respect to the reporting of nuclear material and its processing and use, as well as the declaration of facilities where such material has been processed and stored....”
- Iran's development of its enrichment capability took place over 18 years and in secrecy. This places Iran's actions outside the category of “minor.”
- As a consequence of Iran's safeguards violations, the United Nations Security Council has passed five resolutions, four of them containing sanctions, calling on Iran to halt uranium enrichment, accept the Additional Protocol, and comply with IAEA requests to clarify key past activities concerning the military dimensions of its program, including the role of military organizations in the centrifuge program and a set of records, referred to as the “laptop documents” which we discuss further in this document.”
- The November 2004 IAEA report enumerates Iran's safeguards violations and notes that Iran's cooperation up to October 2003 was marked by “extensive concealment, misleading information and delays in access to nuclear material and facilities,” include its imports of nuclear material, falsehoods about the origin of centrifuge technology and equipment, and its enrichment activities.

ISIS Report: Misconceptions about Iran's Nuclear Program - II

2. **All of Iran's nuclear facilities are under safeguards or monitoring, or alternatively the IAEA has found no evidence that Iran has any secret nuclear facilities**
- Many key nuclear activities and facilities are not under any type of IAEA monitoring.
 - This lack of Iranian transparency poses one of the most difficult challenges to determining whether Iran has undeclared nuclear activities and materials and is conducting nuclear weapons work.
 - The IAEA safeguards system in Iran is currently limited to traditional safeguards under an INFCIRC/153 agreement, which is part of Iran's obligations under the Nuclear NPT.
 - Agreement applies to all of Iran's sources of special fissionable material for the exclusive purpose of verifying that such material is not diverted to nuclear weapons or other nuclear explosive devices.
 - Iran agreed to allow this agreement in 2003, then decided to no longer do so in 2006.
 - The IAEA has reported that it is unable to determine if Iran has undeclared nuclear materials or activities.
 - In the past, the IAEA has found evidence of secret nuclear sites.
 - Now, the IAEA is limited in its ability to look for any such sites because of the weakened inspections and Iran's interpretation of its obligations to the IAEA under INFCIRC/153.
 - The IAEA maintains safeguards at the Bushehr nuclear reactor, several facilities at Esfahan (including uranium conversion and fuel fabrication facilities), the Natanz fuel enrichment plants, the Tehran Research Reactor, a facility for radioactive waste storage facility and a laboratory.

ISIS Report: Misconceptions about Iran's Nuclear Program - III

3. Iran is fully in compliance with its safeguards obligations

- Iran has refused multiple IAEA requests to verify design information for the Arak heavy water reactor and its associated facilities currently under construction. The IAEA has stated that this refusal is inconsistent with its obligations under INFCIRC/153.
- The IAEA also takes issue with Iran's decision to stop providing information about new nuclear facilities when it makes a decision to construct them.
 - Iran is insisting on adhering to a long outdated version of its safeguards undertakings by agreeing to provide such information only 180 days before the introduction of nuclear material into the facility.
 - Iran initially agreed to provide early notification in 2003, but subsequently reversed its decision. The IAEA states that such a unilateral decision is inconsistent with Iran's obligations under INFCIRC/153.
 - Iran has built secret nuclear sites, including the Natanz gas centrifuge complex, exploiting this outdated arrangement. Iran confirmed its existence in early 2003 only after it was exposed publicly by groups such as ISIS.
 - Gaining assurance that no such sites are under construction now is critical to ensuring that Iran is not trying to exploit this dispute to build nuclear facilities in secret.

ISIS Report: Misconceptions about Iran's Nuclear Program - IV

4. Producing HEU from LEU is a long and arduous process, and nuclear weapons breakout will take between one and three years

- Learning to produce enriched uranium by operating centrifuges in large numbers is the difficult part on the road to developing a viable gas centrifuge capability.
- Enriching low enriched uranium (LEU) to highly enriched uranium (HEU) is relatively straightforward and can be done quickly, in some cases within months.
 - This process of enriching a stock of LEU to weapon-grade is called a nuclear weapons “break-out” capability.
- Iran's centrifuge program has advanced considerably in the last year.
 - Iran has succeeded in manufacturing and installing large numbers of centrifuges and ramping up its production of LEU.
 - As of the end of May 2009, Iran had over 7,000 centrifuges enriching uranium or under vacuum and ready to enrich, and had produced over 1,300 kilograms of low enriched uranium hexafluoride.
- The ISIS concludes in its reporting that Iran has not made the political decision to develop a nuclear weapon, but that should its leadership so decide, Iran would have viable options for producing enough weapon-grade uranium for a nuclear weapon within six months or less.

ISIS Report: Misconceptions about Iran's Nuclear Program - V

5. Iran does not currently have a nuclear weapons capability

- Iran's gas centrifuge program is currently large enough to provide Iran several ways to produce weapon-grade uranium.
- The time needed to produce enough weapon-grade uranium for a nuclear weapon is measured in months or a few years at most.
- Iran currently operates enough centrifuges at the Natanz Fuel Enrichment Plant to produce weapon-grade uranium directly from natural uranium,
 - If it decided to do so it would need to adjust the cascades or install a relatively small number of new cascades specifically for that purpose.
- As an alternative to modifying the Natanz facility, Iran is capable of building a clandestine plant to make weapon-grade uranium from natural uranium. It has established at Natanz that it can build, install and operate large numbers of cascades. Given the risk of military strikes against Natanz if Iran were making weapon-grade there, it might prefer to build a parallel, secret plant.
- Iran would also need a supply of uranium hexafluoride for such a facility;
 - all of the uranium hexafluoride produced by Esfahan is under safeguards, so it would also likely need to construct a secret parallel facility to make uranium hexafluoride or acquire it illicitly from an overseas supplier.
- Given Iran's refusal to accept any but the weakest safeguards, the IAEA is unable to provide assurances about the absence of any undeclared nuclear materials or facilities. It has no access to centrifuge manufacturing workshops, making it difficult to know how many centrifuges are being produced and where they are stored. Adding in a long history of clandestine nuclear activities, the possibility of Iran building a secret gas centrifuge plant cannot be ruled-out.

ISIS Report: Misconceptions about Iran's Nuclear Program – VI

6. Iran would have to conduct a full-scale nuclear test in order to build a nuclear weapon

- Developing an implosion-type nuclear weapon can be done without needing a full-scale test.
- Most states pursuing a clandestine nuclear weapons program have sought to avoid the need for full-scale testing.
 - If a test is conducted, as it was by Pakistan and North Korea, it served to further refine nuclear weapons skills and more importantly demonstrate dramatically a strategic and political point.
- States have used different options to avoid the need for tests.
 - Pakistan did so after receiving a tested warhead design from China in the early 1980s.
 - To develop confidence in its implosion design, prior to the Gulf War, Iraq was developing a set of tests of components and of the entire device with a surrogate material substituting for HEU.
 - South Africa was likewise planning to pursue this approach for an implosion weapon. Iran would likely follow a path to maximize its flexibility and minimize its requirements for HEU.

ISIS Report: Misconceptions about Iran's Nuclear Program – VII

6. The “laptop documents” are forgeries

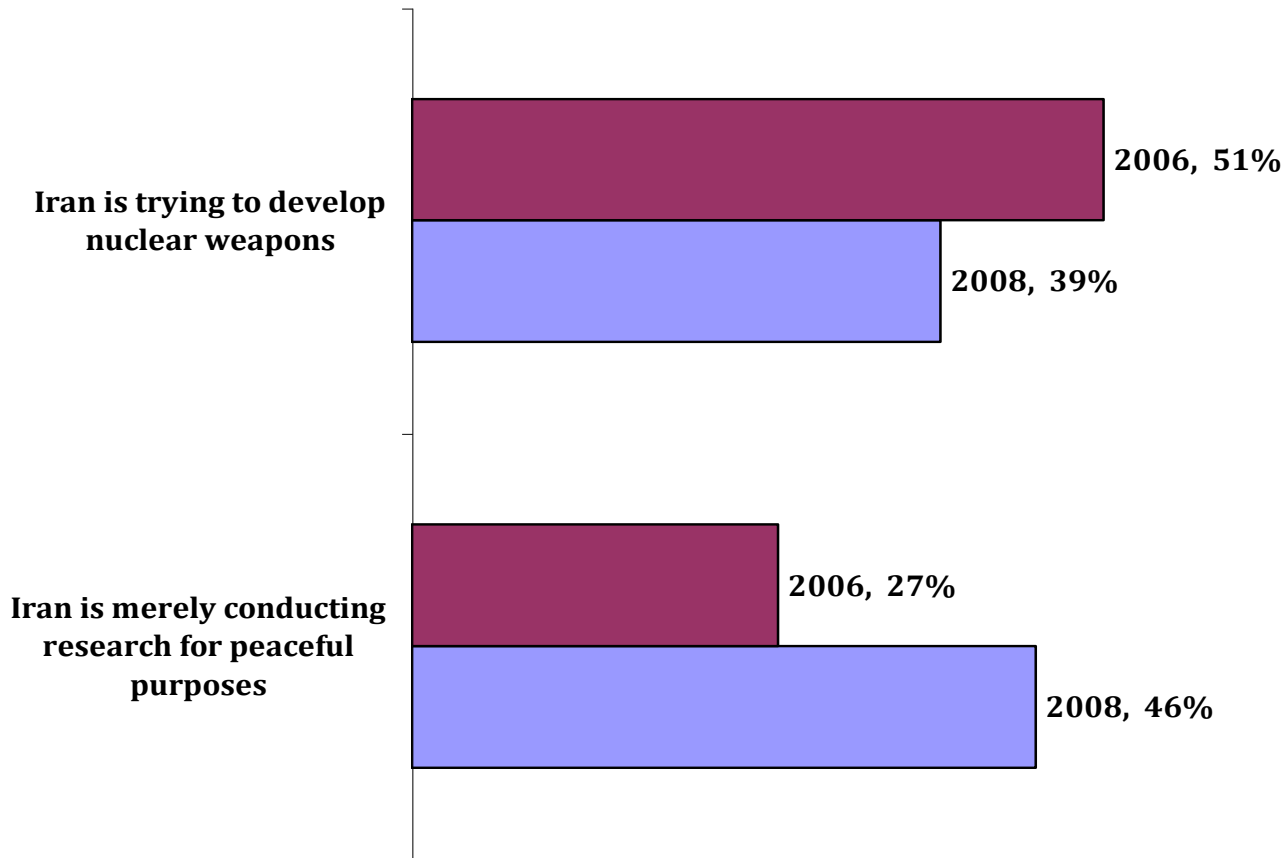
- The story of the laptop documents was broken in 2005 and 2006 by Carla Anne Robbins, then at the Wall Street Journal, and Dafna Linzer, at the time writing for the Washington Post.
- The February 27, 2006 IAEA report notes that on December 5, 2005 the IAEA “repeated its request for a meeting to discuss information that had been made available to the Secretariat about alleged studies, including what is known as the Green Salt Project, concerning the conversion of uranium dioxide into uranium tetrafluoride (often referred to as “green salt”), tests related to high explosives, and the design of a missile re-entry vehicle.
 - Iran agreed to the meeting in January and officials met February 26, 2006. Iranian officials responded that the allegations were “based on false and fabricated documents so they were baseless,” and that neither such a project nor such studies exist or did exist.”
 - Later, Iran said that some of the documents were authentic but had nothing to do with nuclear weapons.
- IAEA analysts who reviewed the documents assessed that the volume of material, level of detail, including names, places and entities, do not support the conclusion that the documents are forgeries.
- The IAEA has continued to pursue the matter with Iran. Its May 2008 report contains an annotated listing of thirteen documents related to the laptop or “alleged studies.”
- Iran has repeatedly refused IAEA requests to meet with individuals named in the documents, in particular Dr. Mohsen Fakhrizadeh, who appears to be at the center of the alleged nuclear weaponization-related research and development.

Arab Public Opinion on Whether Iran Has A Nuclear Program

Changes in Views of Iran's Nuclear Program, 2006-2008

6-Country Total

Do you believe that:

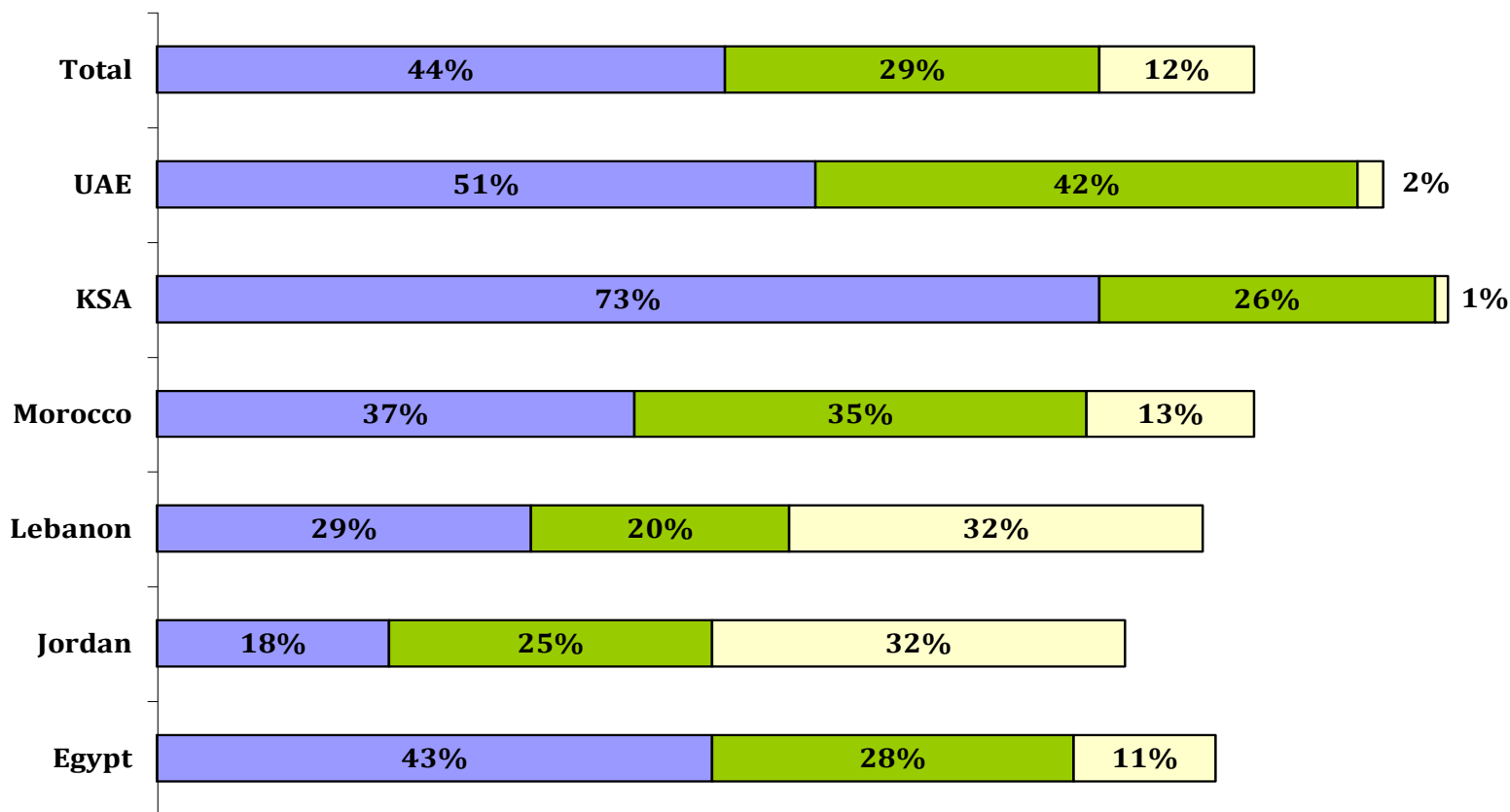


Source: ShibleyTelhami, 2008 Annual Arab Public Opinion Poll Survey of the Survey of the Anwar Anwar Sadat Chair for Peace and Sadat Chair for Peace and Development at the University of Maryland Development at the University of Maryland (with Zogby International) International) Conducted March 2008 in Egypt, Jordan, Survey conducted March 2008 in Egypt, Jordan, Lebanon, Morocco, Saudi Arabia (KSA) and the Lebanon, Morocco, Saudi Arabia (KSA) and the UAE UAE

Arab Public Opinion on Impact of Iran's Nuclear Program

2008 Iran's Nuclear Program
If Iran acquires nuclear weapons, which of the following is the likely outcome for the Middle East:

■ The outcome would be more positive
 ■ The outcome would be more negative
 ■ It would not matter



Source: ShibleyTelhami, 2008 Annual Arab Public Opinion Poll Survey of the Survey of the Anwar Anwar Sadat Chair for Peace and Sadat Chair for Peace and Development at the University of Maryland Development at the University of Maryland (with Zogby International) International) Conducted March 2008 in Egypt, Jordan, Survey conducted March 2008 in Egypt, Jordan, Lebanon, Morocco, Saudi Arabia (KSA) and the Lebanon, Morocco, Saudi Arabia (KSA) and the UAE UAE

300 miles
500 km

TURKEY

TURKMENISTAN

CASPIAN SEA

Lashkar A'bad



Tehran

Sites circled in red
unknown pre-mid 2002

IRAQ



Arak



Isfahan



Natanz



Saghand

IRAN



Ardekan

MW Megawatts

Uranium processing facility

Uranium mines

Heavy-water facility

Research reactors / research facilities

Uranium enrichment facility

Light-water reactor (under construction)

MIDDLE EAST

AFGHANISTAN

PAKISTAN

KUWAIT

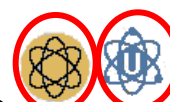


Bushehr

SAUDI ARABIA

BAHRAIN

QATAR



Gachin

The Gulf

Gulf of Oman

Vehicle Entrance Ramp
(before burial)

Bunkered underground
production halls

Admin/engineering
office area

DigitalGlobe Quickbird commercial satellite image

20 SEP 02

Vehicle Entrance Ramp
(after burial)

Bunkered underground
Centrifuge cascade halls

Helicopter
pads

New security
wall

Dummy building
concealing tunnel
entrance ramp

Admin/engineering
office area

DigitalGlobe Quickbird commercial satellite image

21 JUL 04

Effective Concealment



How Much is Enough?

Amount of Fissile Material Need to Build a Basic Fission (Non-Boosted) Weapon

Highly Enriched Uranium

HEU (90% U-235)

Simple gun-type weapon	90-110 lbs/40-50 kg
Simple implosion weapon	33lbs/15 kg
Sophisticated implosion weapon	20-26lbs/9-12kg

Weapons Grade Plutonium

Simple implosion weapon	14lbs/6 kg
Sophisticated implosion weapon	4.5-9lbs/2-4 kg

Extract from the unclassified estimates in Union of Concerned Scientists, "Preventing Nuclear Terrorism Fact Sheet," April 2004, and work by Abdullah Toucan

Iran's Centrifuge and LEU Status June 1, 2009 and Estimates in Moving toward Weapons Grade Uranium - I

Iran's progress towards this status as of June 1, 2009 is *estimated* below:

- Amount of U-235 contained in Iran's stockpile of low-enriched uranium: 31.7 kg
- Amount of this U-235 produced each month: 2 kg
- Amount of this U-235 required to fuel a first-generation implosion bomb: 21.6 kg
- Date by which Iran is likely to have stockpiled the above: December 2008
- Number of additional months needed to convert this low-enriched uranium to weapon-grade: 2-3
- Date by which Iran may have enough U-235 to fuel a second bomb: October 2009
- Date by which Iran may have enough U-235 to fuel a third bomb: November 2009

Iran's Centrifuge and LEU Status June 1, 2009 and Estimates in Moving toward Weapons Grade Uranium – II

Additional estimates: *Moving from reactor-grade to weapon-grade uranium*

- Amount of uranium hexafluoride (UF6) enriched to 3.5 percent U-235 now on hand: **1,339 kg**
- Average daily production rate of this low-enriched UF6: **2.75 kg**
- Average monthly production rate of this low-enriched UF6: **71.4 kg**
- Amount of this LEU needed to produce a bomb's worth of weapon-grade UF6: **914 kg**
- Number of separative work units (SWUs) needed to accomplish the above: **840**
- Average number of SWUs each centrifuge now appears to be producing per year: **0.3**
- Average number of SWUs each centrifuge produced per year between December 2007 and November 2008: **0.5**
- Number of first generation IR-1 centrifuges being fed with UF6 at the Natanz Fuel Enrichment Plant: **4,920**
- Total number of centrifuges installed at Natanz: **7,052**
- Number of SWUs these 7,052 centrifuges are assumed to produce per year: **7,000**
- Number of SWUs these centrifuges appear to be producing per year: **2,000**
- Total number of centrifuges installed or being installed at Natanz, as of February 1, 2009: **5,904**
- Number of SWUs these 5,904 centrifuges are assumed to be capable of producing per year: **7,000**
- Number of months needed for these 5,904 centrifuges operating at such a capacity to produce 840 SWUs: **1.5**

Iran's Centrifuge and LEU Status June 1, 2009 and Estimates in Moving toward Weapons Grade Uranium – II

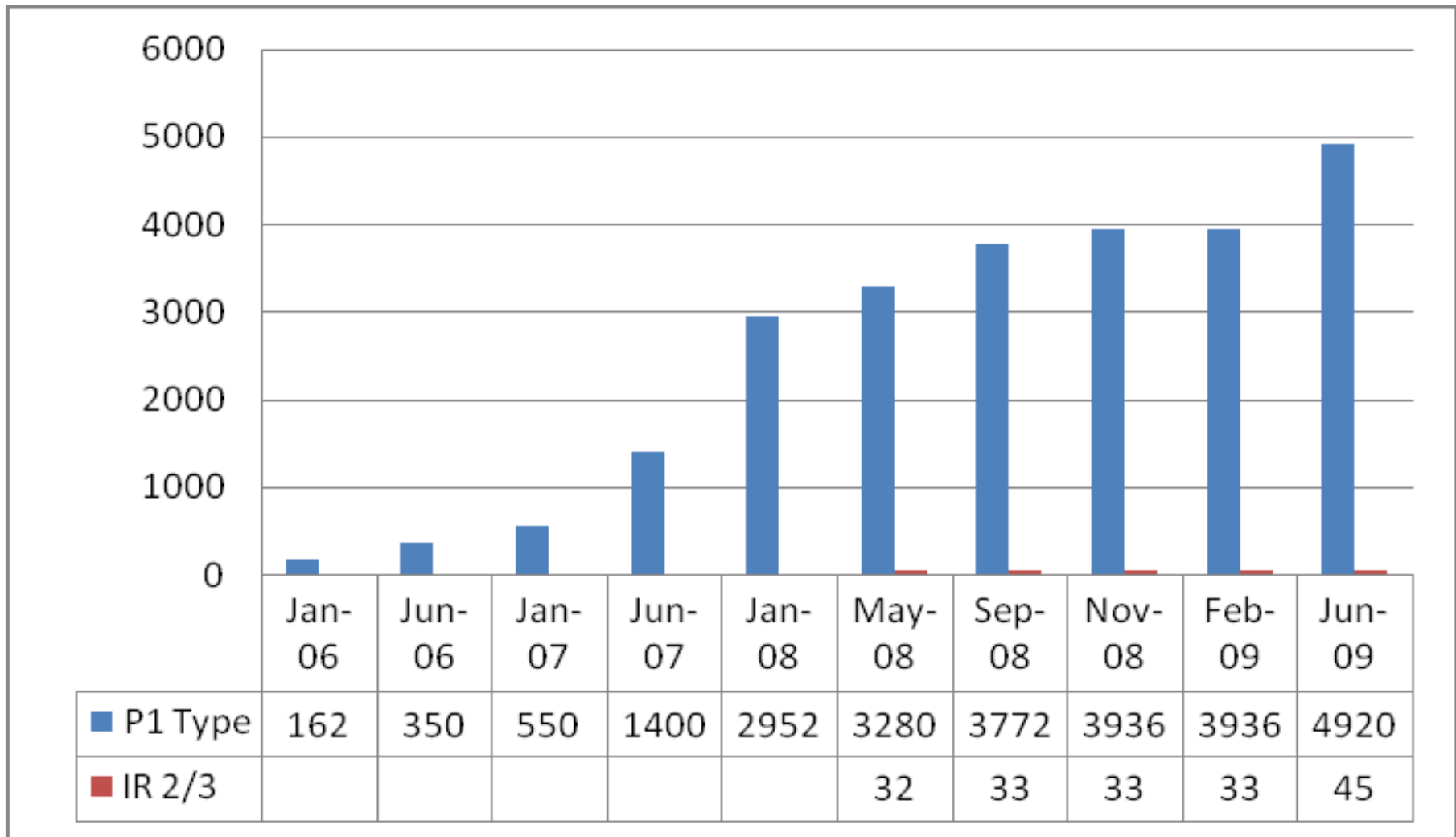
Additional estimates: *Low-enriched uranium production*

- Amount of UF₆ produced through November 7, 2008: **357 metric tons**
- Approximate number of first-generation implosion bombs that this amount of UF₆ could fuel if enriched to weapon grade: **45-50**
- Amount of UF₆ fed into centrifuges through November 7, 2008: **9,956 kg**
- Average monthly feed rate of UF₆ as of November 7, 2008: **1,024 kg**
- Monthly feed rate of UF₆ from December 12, 2007 to August 30, 2008: **698 kg**
- Average monthly percentage of natural uranium feed converted to low-enriched UF₆ product from February 2007 to December 12, 2007: **0.43**
- Average monthly percentage of natural uranium feed converted to low-enriched UF₆ product from December 12, 2007 to August 30, 2008: **0.80**
- Percentage increase in feed rate: **47%**

Number of centrifuges deployed over time

Date of IAEA Inventory	Centrifuges Being Fed with UF6	Centrifuges Being Tested without UF6	Centrifuges Being Installed
2/17/2007	0	328	328
5/13/2007	1312	328	492
8/19/2007	1968	328	328
11/3/2007	2952	0	0
12/12/2007	2952	0	?
5/7/2008	3280	164	2460
8/30/2008	3772	164	2132
11/7/2008	3772	?	2132
2/1/2009	3936	125	1968
6/1/2009	4920	169	2296

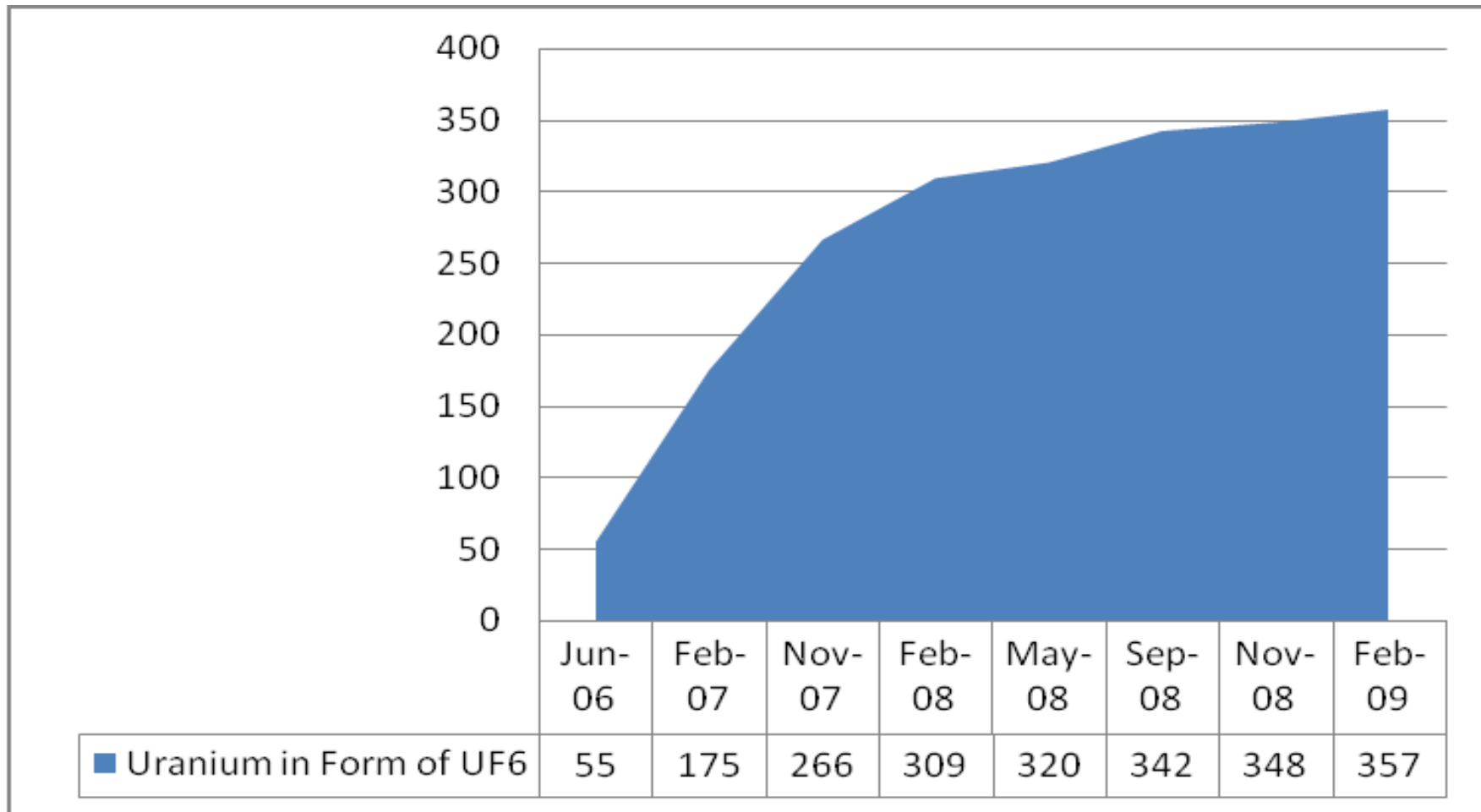
Number of Centrifuges Enriching Uranium at Natanz FEP



Source: Adapted by Adam C. Seitz from various IAEA reports, ISIS analysis, and University of Wisconsin Project on Nuclear Arms Control.

Cumulative UF6 Production at Esfahan

(in metric tonnes of uranium mass)



Source: Adapted by Adam C. Seitz from various IAEA reports, ISIS analysis, and University of Wisconsin Project on Nuclear Arms Control.

Stages of Development of Iran's Missiles - I

Designation	Stages	Progenitor Missiles	Propellant	Range (Kilometers)	Payload (Kilograms)	IOC (Year)	Inventory
Fateh A-110 (NP-110)	1	Zelzal-2 variant, DF-11, CSS-8	solid	210	500	2003	?
Tondar 69	1	CSS-8	solid	150	150-200	?	200
M-9 variant	1	CSS-6, DF-15	solid	800	320	?	?
M-11 variant	1	CSS-7, DF-11	solid	400	?	?	80
Mushak-120	1	CSS-8, SA-2	solid	130	500	2001	200
Mushak-160 (Fateh 110)	1	CSS-8, SA-2	solid, liquid	160	500	2002	?
Mushak-200 (Zelzal-2)	1	SA-2	solid, liquid	200	500	NA	?
Saegheh	1?	?	solid	75-225	?	?	?

Source: Adapted from GlobalSecurity.org, available at <http://www.globalsecurity.org/wmd/world/iran/missile.htm>; the Federation of American Scientists, available at <http://www.fas.org/nuke/guide/iran/missile>; The Claremont Institute: Ballistic Missiles of the World, <http://www.missilethreat.com/missiles/index.html>. N/A = not available, <http://www.iiss.org/publications/strategic-comments/past-issues/volume-15-2009/volume-15-issue-1/irans-missile-development/>.

Stages of Development of Iran's Missiles - II

Designation	Stages	Progenitor Missiles	Propellant	Range (Kilometers)	Payload (Kilograms)	IOC (Year)	Inventory
Shahab-1	1	Soviet SSN-4, N Korean SCUD B	liquid	285-330	987-1,000	1995	250-300
Shahab-2	1	Soviet SSN-4, N Korean SCUD C	liquid	500-700	750-989	?	50-450
Shahab-3	1	Nodong-1	liquid	1,280-1600	760-1,158	2002	25-100
Shahab-4	2	Taep'odong-1	liquid	2,000-3,000	1,040-1,500	N/A	0
Ghadr 101	multi	Shaheen-1	solid	2,500	N/A	N/A	0
Ghadr 110	multi	Shaheen-2	solid	3,000	N/A	N/A	0
IRIS	1	M-18	solid	3,000	760-1,158	2005	N/A
Kh-55	1	Soviet AS-15	jet engine	2,900-3,000	200 kgt nuclear	2001	12
Shahab-5	3	Taep'odong-2	liquid	4,000-5,500	390-1,000	N/A	0
Shahab-6	3	Taep'odong-2	liquid	6,000-10,000	270-1,220	N/A	0
Sajjil-2	2	?	solid	1,500-2,000	?	2008	?

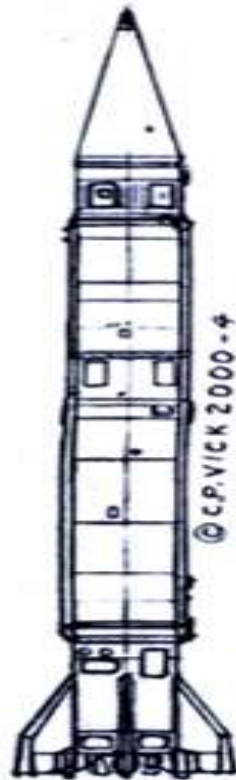
Source: Adapted from GlobalSecurity.org, available at <http://www.globalsecurity.org/wmd/world/iran/missile.htm>; the Federation of American Scientists, available at <http://www.fas.org/nuke/guide/iran/missile>; The Claremont Institute: Ballistic Missiles of the World, <http://www.missilethreat.com/missiles/index.html>. N/A = not available, <http://www.iiss.org/publications/strategic-comments/past-issues/volume-15-2009/volume-15-issue-1/irans-missile-development/>.

Iranian Missile Program

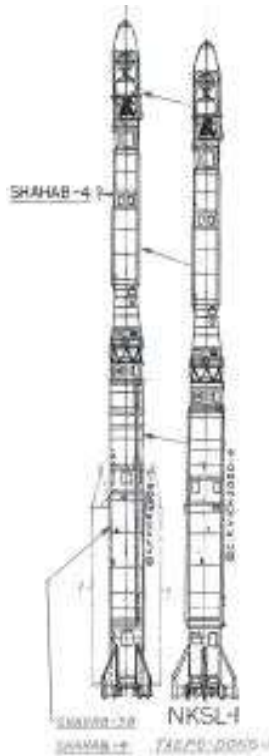
Shahab-3



No Dong



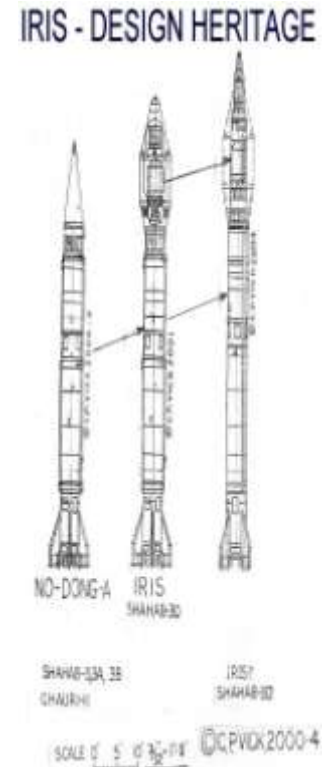
Shahab-4



Variant



IRIS

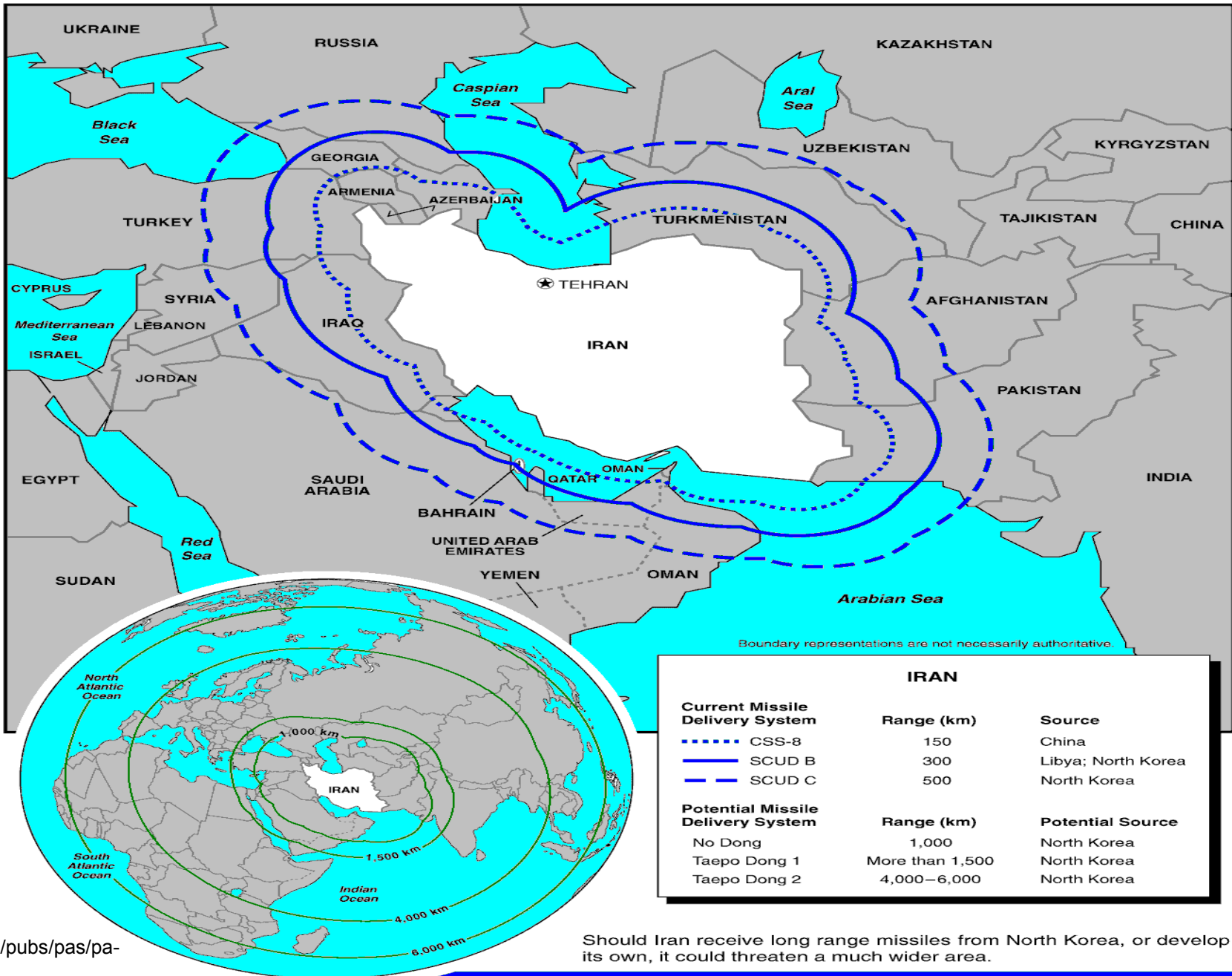


Range	1,300	1,300	2,000	2,000	3,000
Payload	~1,000	700-1000	?	700	~1,000
IOC	2002	?	?	?	2005

Estimated Iranian Missile Ranges



Estimated Ranges of Current and Potential Iranian Ballistic Missiles



Source:
<http://www.cato.org/pubs/pas/pa-309.html>

Should Iran receive long range missiles from North Korea, or develop its own, it could threaten a much wider area.

Strike on Iran?

- **Timelines: Acquisition? Deployment? Modernization?**
- **Targeting intelligence?**
- **Dispersal, hardening, concealment?**
- **Hardening vs. Attack Lethality**
- **SEAD: Penetration? Suppression? Kill?**
- **Range-payload, refuel, recovery**
- **Restrike? Penetration corridor enforcement?**
- **LOW? LUA? Covert?**

Post-Strike on Iran/ Parallel Iranian Options

- **IR-2, IR-3, IR-3 “cooled,” IR-4**
- **Folded centrifuge**
- **Concealed heavy water reactor**
- **LWR cannibalization**
- **LWR download**
- **Dirty weapons**
- **Basic biological**
- **Genetic engineered weapons**

Key Force Posture Decisions

- **US and/or Israel**
 - **Prevent, preempt, contain, deter, retaliate, mutual assured destruction.**
- **Iran and Israel:**
 - **In reserve (secure storage), launch on warning (LOW), launch under attack (LOA), ride out and retaliate**
 - **Continuous alert, dispersal**
 - **Point, wide area defense goals**
- **Israel:**
 - **Basing mode: sea basing, sheltered missiles.**
 - **Limited strike, existential national, multinational survivable.**
- **US:**
 - **Level of defensive aid.**
 - **Ambiguous response**
 - **Clear deployment of nuclear response capability.**
 - **Extended deterrence. Assured retaliation.**
- **Gulf:**
 - **Passive (wait out), defensive, or go nuclear.**
 - **Ballistic, cruise missile, air defense.**
 - **Seek extended deterrence from US**

Key Force Posture Decisions - II

- **Syria:**
 - **Link or decouple from Iran.**
 - **Passive (tacit threat) or active (clear, combat ready deployment).**
- **Non-State Actor:**
 - **Tacit or covert capability.**
 - **Proven capability.**
 - **Deployment mode: Hidden, dispersed, pre-emplaced**

Iran's Hypothetical Forces

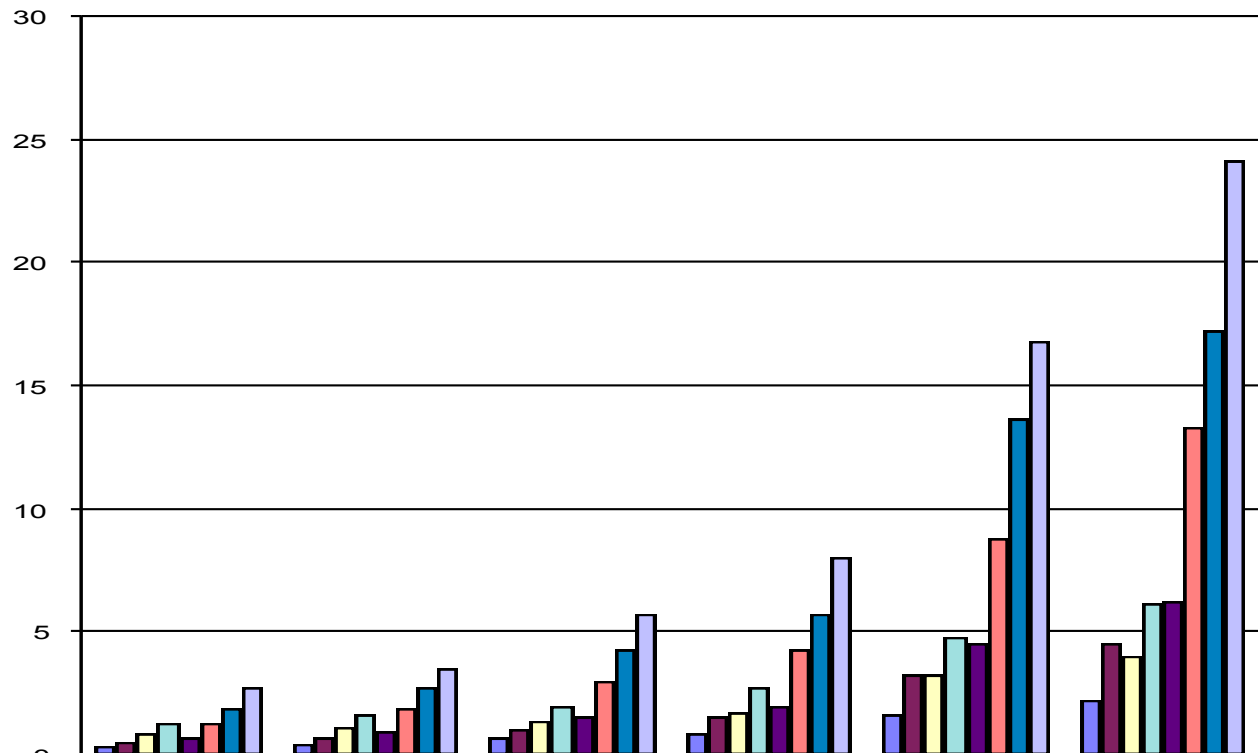
- **Less than 50 nuclear weapons, most fission, possibly some boosted. 30 Nuclear warheads, 20 bombs.**
 - **Most 20-30 Kt, some 100 KT**
- **100 Shahab 3 and 3 ER on mobile TELs. 60 TELs.**
- **Su-24, F-14 convert, and Su-37 strike aircraft.**
- **Reverse engineered KH-55 cruise missiles.**
- **Mustard and persistent nerve gas, stable bombs, bombs and warheads with cluster munitions.**
- **Limited satellite targeting and damage assessment capability.**
- **Limited ballistic missile point defense capability with SA-300/SA-400**
- **Meaningful civil defense? No.**

Israel's Hypothetical Forces

- **200+ boosted and fusion weapons.**
 - **Most 20-100 Kt variable yield, some 1 Megaton.**
- **100 Jericho 1 and 2.**
- **30 Jericho ER.**
- **JSF, F15I, F-16I with nuclear-armed cruise missiles, advanced conventional precision strike capability.**
- **3 Dolphin submarines with nuclear armed SLCMs.**
- **High resolution satellite targeting and damage assessment capability.**
- **Moderate ballistic missile point and area defense capability with Arrow IV/V and Patriot PAC-3 TMD.**
- **CW? Assume Yes. BW? Assume No.**
- **Meaningful civil defense? CW only.**

Why Yield Matters

(Seriousness of Effect in Kilometers as a Function of Yield)

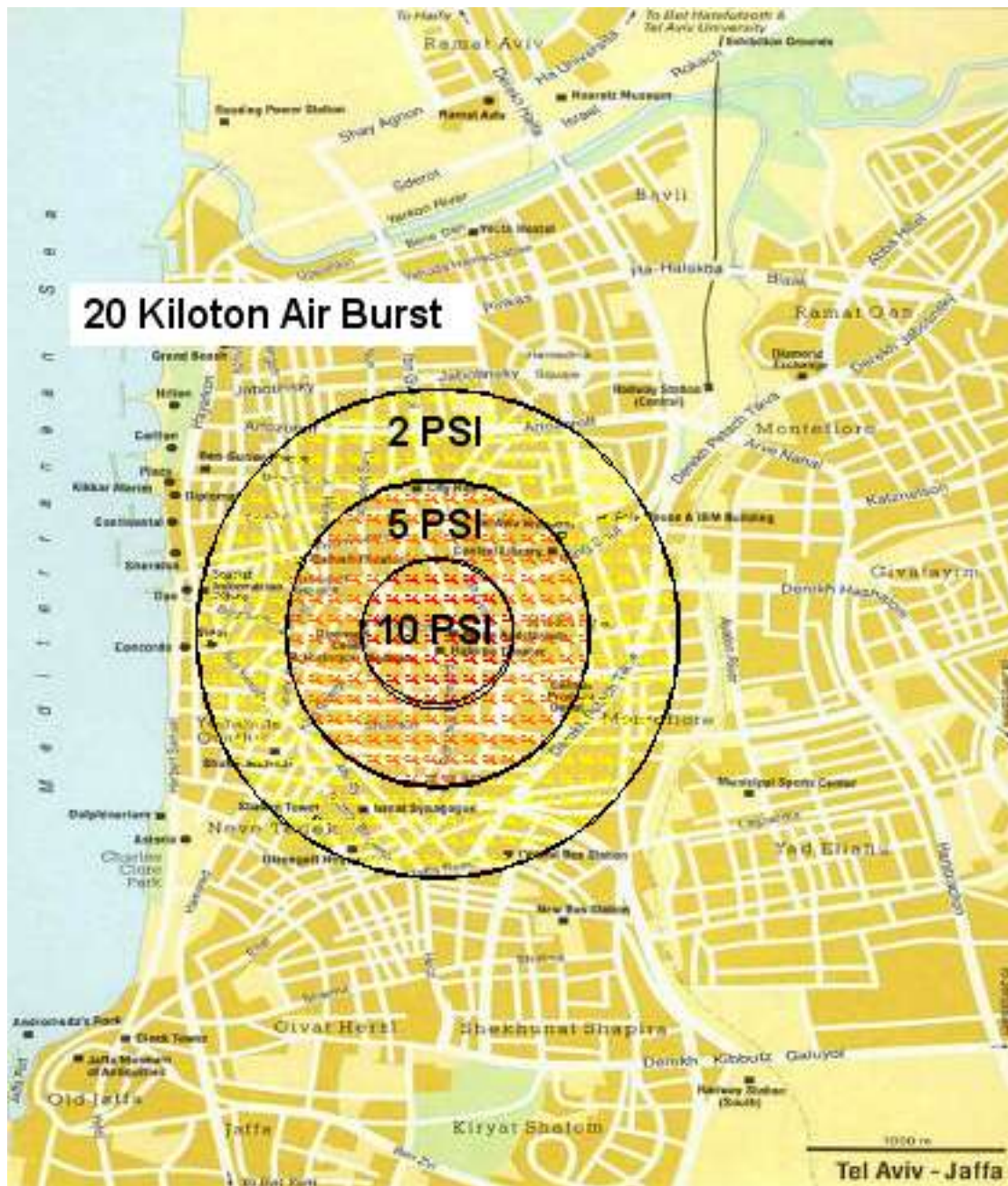


■ Fireball	0.352	0.464	0.67	0.884	1.6	2.2
■ Metals Vaporize	0.477	0.675	1	1.5	3.2	4.5
■ 10-Psi	0.875	1.1	1.4	1.7	3.2	4
■ 5-Psi	1.3	1.6	2	2.7	4.8	6.1
■ Metals Melt	0.675	0.954	1.5	2	4.5	6.2
■ Plastics Melt/Ignite	1.3	1.9	3	4.3	8.8	13.3
■ Wood chars/Burns	1.9	2.7	4.3	5.7	13.6	17.2
■ 3rd Degree Burns	2.7	3.5	5.7	8	16.8	24.1

Source: Adapted by Anthony H. Cordesman from the Royal United Services Institute, Nuclear Attack: Civil Defense, London, RUSI/Brassey's, 1982, pp. 30-36

Israel:

**Blast
coverage
of 20KT
Iranian
Nuclear
Weapon**

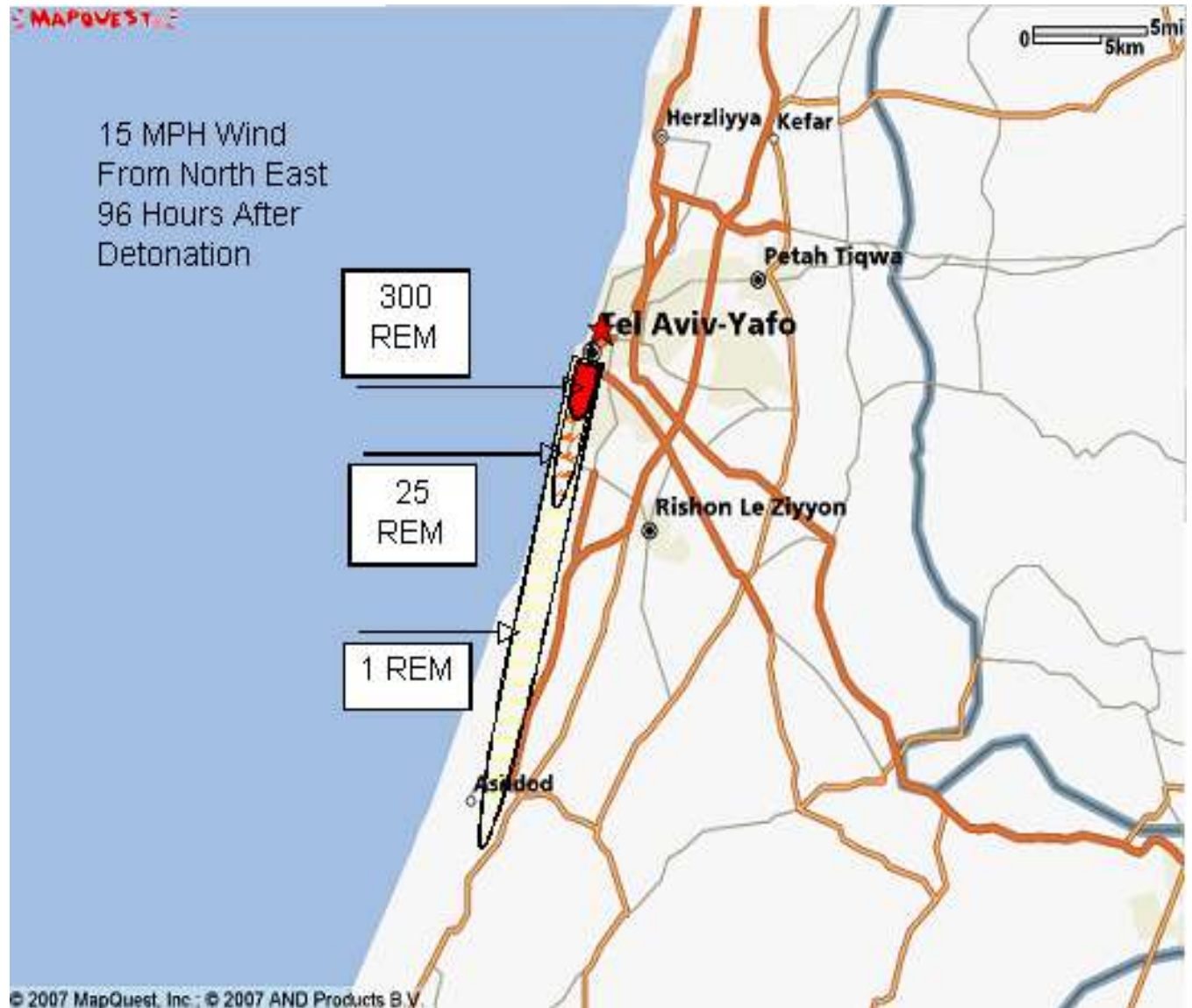


Fall Out

- **The closer to ground a bomb is detonated, the more dust and debris is thrown into the air, and the more local fallout.**
- **Impact with the ground severely limits the blast and radiation from a bomb. Ground bursts are not usually considered tactically advantageous, with the exception of hardened underground targets such as missile silos or command centers.**
- **Population kills can be different. For a 1 MT explosion, lethal ellipses can reach 40-80 miles against unsheltered populations after 18 hours**
- **For a 1 MT explosion, lethal ellipses will reach 40-80 miles against unsheltered populations after 18 hours. Area of extreme lethality (3000 rads) can easily reach 20+ miles.**
- **A dose of 5.3 Gy (Grays) to 8.3 Gy is considered lethal but not immediately incapacitating. Personnel will have their performance degraded within 2 to 3 hours, and will remain in this disabled state at least 2 days. However, at that point they will experience a recovery period and be effective at performing non-demanding tasks for about 6 days, after which they will relapse for about 4 weeks. At this time they will begin exhibiting symptoms of radiation poisoning of sufficient severity to render them totally ineffective. Death follows at approximately 6 weeks after exposure.**
- **Delayed effects may appear months to years following exposure. Most effects involve tissues or organs. Include life shortening, carcinogenesis, cataract formation, chronic radiodermatitis, decreased fertility, and genetic mutations.**

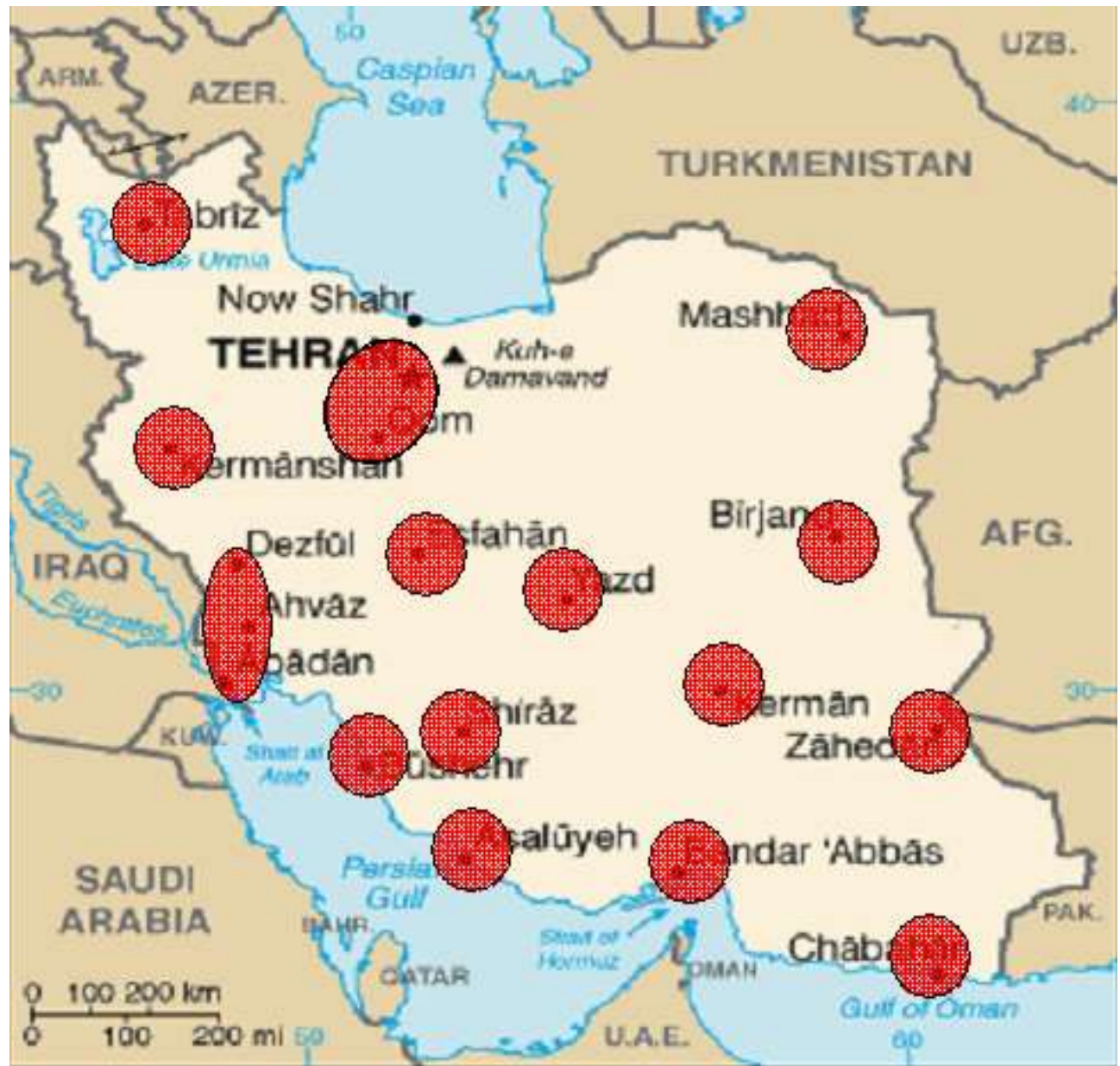
Israel:

Nominal Worst Case 20KT Fall Out Coverage



Iran:

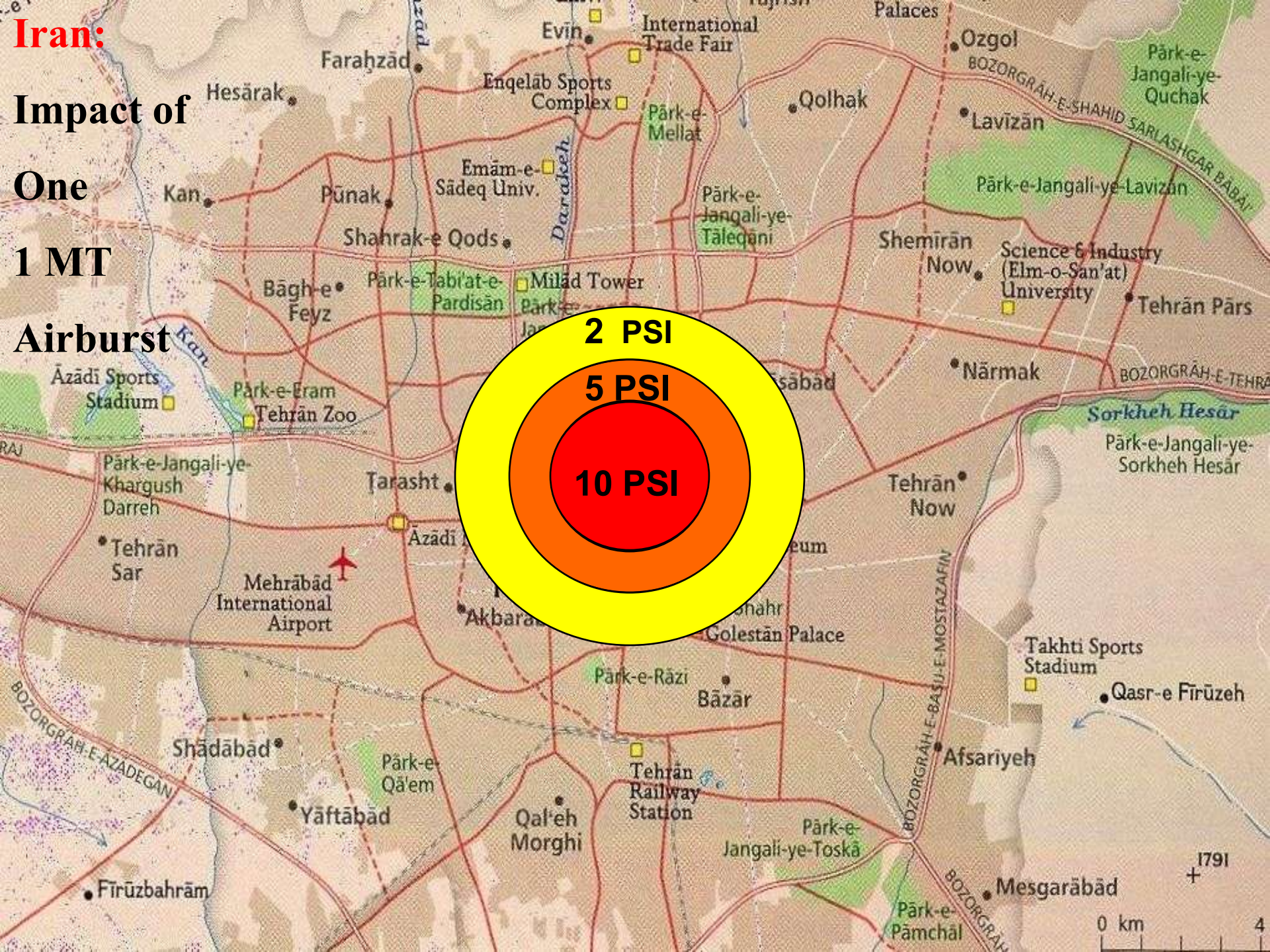
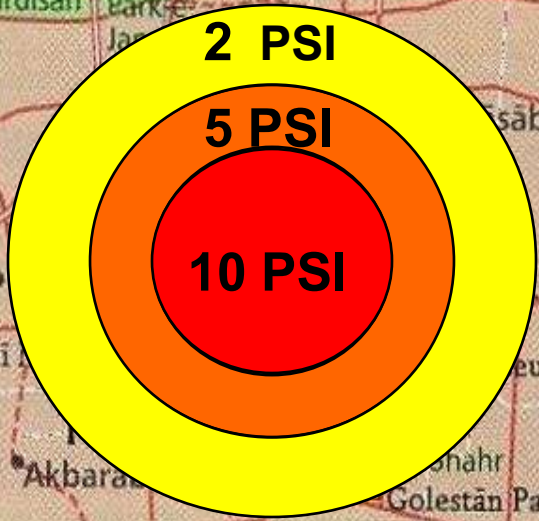
High Value Population Centers



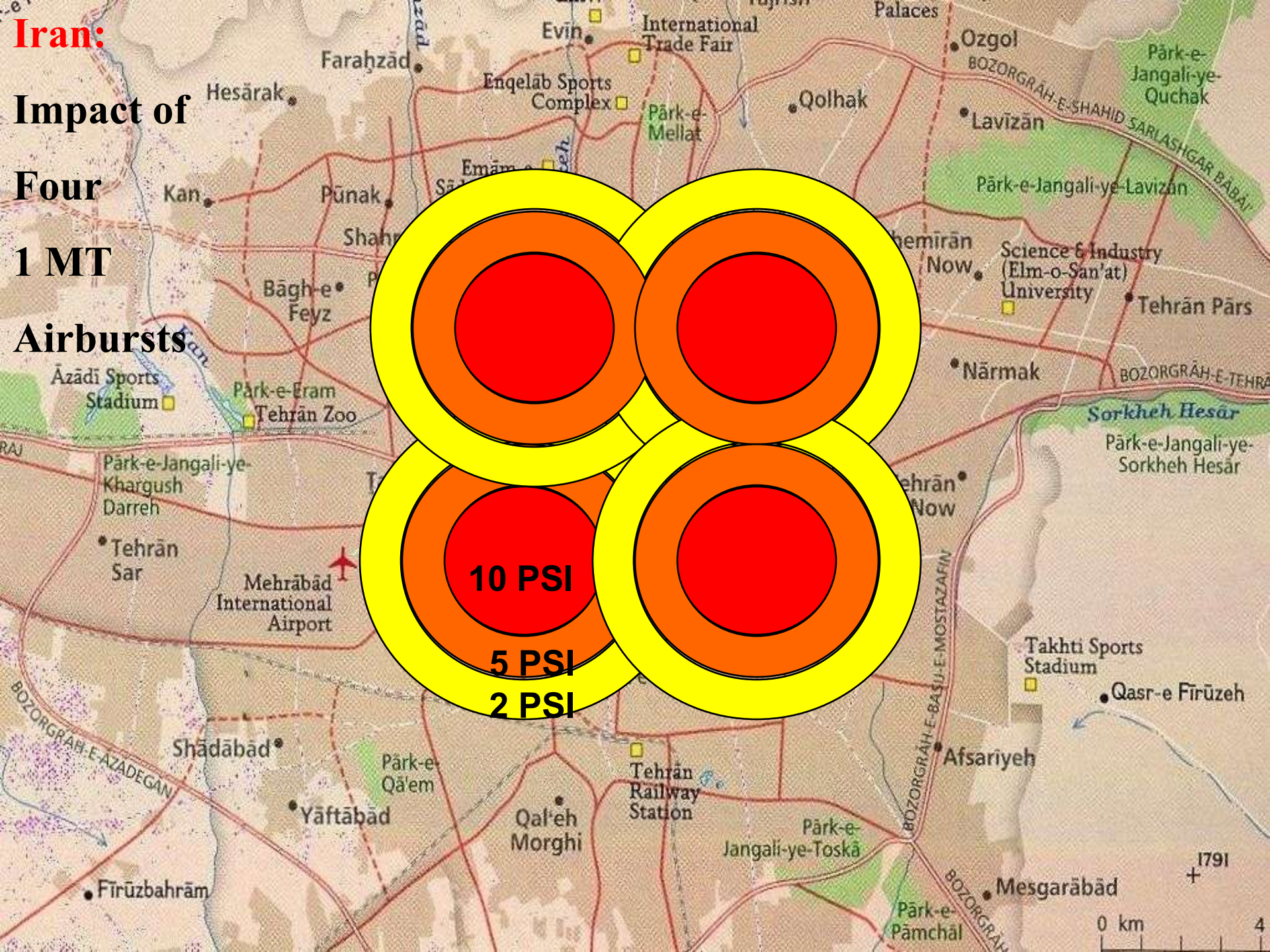
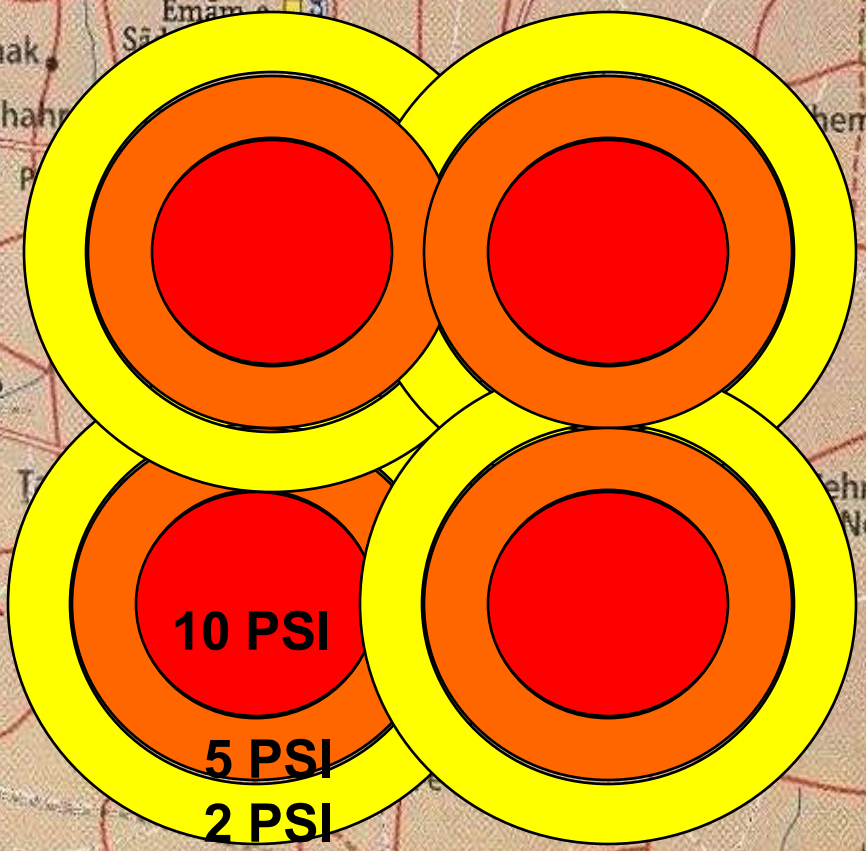
Tehran

- **Iran: Total of 68.7 million.**
 - **Ethnicity:** Persian 51%, Azeri 24%, Gilaki and Mazandarani 8%, Kurd 7%, Arab 3%, Lur 2%, Baloch 2%, Turkmen 2%, other 1%
 - **Religions:** Muslim 98% (Shi'a 89%, Sunni 9%), other (includes Zoroastrian, Jewish, Christian, and Baha'i) 2%
- **Tehran: Topographic basin with mountain reflector. Nearly ideal nuclear killing ground.**
- Land area of 658 square kilometers (254 sq mi)
- Approximately 7.6 million people in city.
- 12.6 million in municipal area and greater metropolitan area, and 15 million in municipal area. **Some 20% of Iran's population.**
- Tehran is a sprawling city at the foot of the Alborz mountain range with an immense network of highways unparalleled in western Asia.
- Hub of the country's railway network. The city has numerous cultural centers
- About 30% of Iran's public-sector workforce and 45% of large industrial firms are located in Tehran. More than half of Iran's industry is based in Tehran..
- Tehran is the biggest and most important educational center of Iran. Nearly 50 major colleges and universities in Greater Tehran.
- Majority of residents are Persians who speak many different dialects of Persian corresponding to their hometown. (including Esfahani, Shirazi, Yazdi, Khuzestani, Semnani, Taleghani, Dari, Judeo-Persian, etc) The second largest linguistic group is that of the Azari.

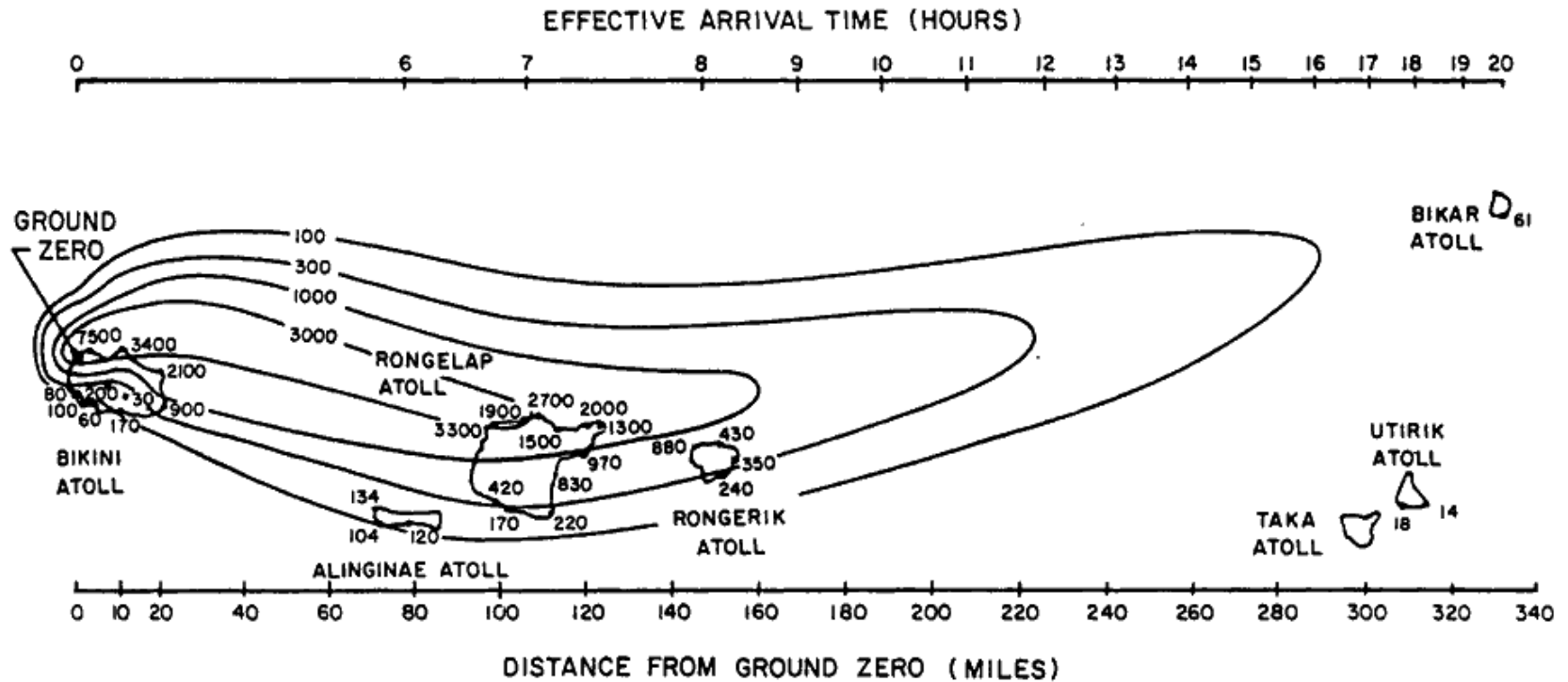
Iran:
Impact of
One
1 MT
Airburst



Iran:
Impact of
Four
1 MT
Airbursts



Tehran: The Fallout Problem



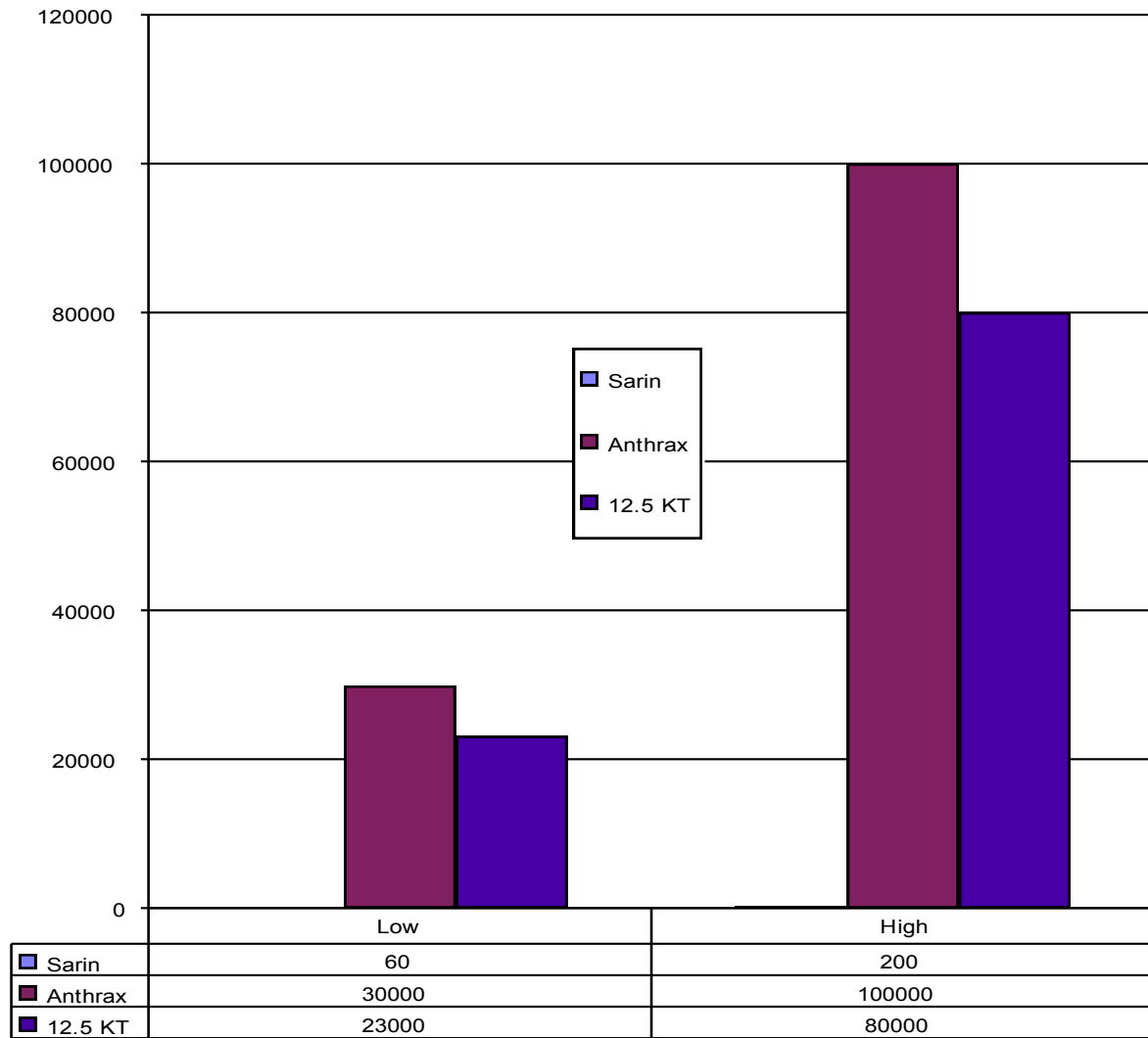
Source: http://en.wikipedia.org/wiki/Nuclear_fallout

Iran Nuclear, US Conventional

- Assume mature, dispersed Iranian force. Preemption limited option for US, but face launch on warning, launch under attack option.
- Iran cannot threaten US. Can threaten US bases in Gulf, Israel, Europe, GCC allies, Egypt, Jordan, oil export capabilities.
- SAD-like environment relying on proxy targets for maximum damage to US.
- Iranian side:
 - Limited strike designed to intimidate or show resolve, force issue without generating massive nuclear retaliation. Might focus on Arab target, rather than US or Israel, to try to limit retaliation.
 - *Reserve strike capability critical.*
 - *Lower fission yields, less accurate force* limit range of targeting, but can cover all US bases and mix of other targets.
 - Target to maximize casualties, clear attention to fall out, lasting effects.
 - Inflict 2,000,000 to 8,000,000 prompt to 21-day dead; long term death rate cannot be calculated.
 - Iranian recovery very possible.
- US side:
 - Some preemptive damage limitation possible.
 - Launch on confirmed warning from US satellites.
 - Massive reserve conventional and nuclear strike capability.
 - Stealth and precision strike capability give weapons of mass effectiveness (WME) capability.
 - Power, refineries, continuity of government, C4I assets.
 - EMP option would be “semi-nuclear” response.

CBRN Prompt (48-hour) Killing Effect in an Urban Environment

The Relative Killing Effect of Chemical vs. Biological vs. Nuclear Weapons



Source: Adapted by Anthony H. Cordesman from Victor A. Utgoff, *The Challenge of Chemical Weapons*, New York, St. Martin's, 1991, pp. 238-242 and Office of Technology Assessment, *Proliferation of Weapons of Mass Destruction: Assessing the Risks*, U.S. Congress OTA-ISC-559, Washington, August, 1993, pp. 56-57.

Q₅₀ for Some Types of BW - Open-Air Deployment

- **Plague (liquid): 3.5-4.5 liter/sq.km**
- **Tularemia (dry): 3.0-4.0 kg/sq.km**
- **Anthrax (dry, old version): 15-20 kg/sq.km**
- **Anthrax (dry, new version): 4.5-5.0 kg/sq.km**
- **Anthrax (liquid): 5.0-5.5 liter/sq.km**
- **Brucellosis (dry): 3.5-4.5 kg/sq.km**
- **Glanders/Melioidosis (liquid): 4.5-5.5 liter/sq.km**
- **Smallpox (liquid): 3.5-4.0 liter/sq.km**
- **Marburg (dry): less than 1.0 kg/sq.km**

New Types of Biological Weapons

- ***Binary biological weapons*** that use two safe to handle elements that can be assembled before use. This could be a virus and helper virus like Hepatitis D or a bacterial virulence plasmid like E. coli, plague, Anthrax, and dysentery.
- ***Designer genes and life forms***, which could include synthetic genes and gene networks, synthetic viruses, and synthetic organisms. These weapons include DNA shuffling, synthetic forms of the flu – which killed more people in 1918 than died in all of World War I and which still kills about 30,000 Americans a year – and synthetic microorganisms.
- ***"Gene therapy" weapons*** that use transforming viruses or similar DNA vectors carrying Trojan horse genes (retrovirus, adenovirus, poxvirus, HSV-1). Such weapons can produce single individual (somatic cell) or inheritable (germline) changes. It can also remove immunities and wound healing capabilities.
- ***Stealth viruses*** can be transforming or conditionally inducible. They exploit the fact that humans normally carry a substantial viral load, and examples are the herpes virus, cytomegalovirus, Epstein-Barr, and SV40 contamination which are normally dormant or limited in infect but can be transformed into far more lethal diseases. They can be introduced over years and then used to blackmail a population.
- ***Host-swapping diseases***: Viral parasites normally have narrow host ranges and develop an evolutionary equilibrium with their hosts. Disruption of this equilibrium normally produces no results, but it can be extremely lethal. Natural examples include AIDS, Hantavirus, Marburg, and Ebola. Tailoring the disruption for attack purposes can produce weapons that are extremely lethal and for which there is no treatment. A tailored disease like AIDS could combine serious initial lethality with crippling long-term effects lasting decades.
- ***Designer diseases*** involve using molecular biology to create the disease first and then constructing a pathogen to produce it. It could eliminate immunity, target normally dormant genes, or instruct cells to commit suicide. Apoptosis is programmed cell death, and specific apoptosis can be used to kill any mix of cells.

Soviet RBK-type Cluster Bomb for CBR Weapons



Non-State Actor CBR(N?)

- **Independent, Proxy, False Flag, or Trigger Force?**
- **Access likely to be more critical in determining capability than ability to create own weapons, but highly lethal BW and genetic weapons may be becoming “off the shelf” option.**
- **Many of same twists as covert State Actor attacks:**
 - **Bypasses defenses.**
 - **Plausible deniability?**
 - **Exploits special vulnerability of “one bomb” states.**
 - **Psychological and political impacts as important as direct killing effects.**
 - **False flag and proxy options clear.**
 - **Buying time may limit risk of retaliation.**
 - **Allows to exploit “slow kill” nature of biological strikes. Achieve “line source” effects**
 - **Covert forces in place can restrike or escalate.**
- **Unclear Non-State Actors are deterrable by any form of retaliation.**

State Actor Covert Bioterrorism, Suitcase Nuclear

- **Bypasses defenses.**
- **Plausible deniability?**
- **Exploits special vulnerability of “one bomb” states.**
- **Psychological and political impacts as important as direct killing effects.**
- **False flag and proxy options clear.**
- **Buying time may limit risk of retaliation.**
- **Allows to exploit “slow kill” nature of biological strikes. Achieve “line source” effects**
- **Covert forces in place can restrike or escalate.**
- **Target potentially faces major weakening of conventional capabilities without ability to counter-escalate.**

Possible Terrorist/Covert/Irregular Deployment of Biological Weapons

- **Use of infected vectors (mosquitoes, fleas, lice, etc.)**
- **Contamination of food and water supplies**
- **Contamination of various articles (letters, books, surfaces, etc.)**
- **Use of different aerosolizing devices and approaches to contaminate inner spaces of various buildings (line and point sources)**
- **Use of different aerosolizing devices and approaches for open-air dissemination (line and point sources)**
- **Inner- and outer-space explosive dissemination including suicide bombers**
- **Terrorist/Sabotage methods of infecting crops and livestock**

WME: “Weapons of Mass Effectiveness”

- **Theoretical possibility, give precision long-range strike capability.**
- **Target mix varies with attacker’s motives.**
- **Broad possible target base in MENA area, varying sharply by country.**
 - **Desalination**
 - **Major power plants, nuclear power plants.**
 - **Water purification and distribution.**
 - **Refinery**
 - **High value, long-lead time oil, gas, and petrochemical facilities.**
 - **Ethnic and sectarian high value targets.**
 - **Leadership elite: Royal family, president, etc.**

Dealing with Nuclear Uncertainty

- **Decide proper mix of four basic military options:**
 - **Prevention/preemption,**
 - **Active and passive defense,**
 - **Acquiring own nuclear weapons, and/or**
 - **US extended deterrence.**
- **Can wait for diplomacy for time being, but need to start considering future options.**
 - **Ballistic and cruise missile defenses maybe cost-effective simply to deal with conventional threat.**
 - **A number of systems offer both improved air and missile defense.**
 - **Need quiet talks with US on containment options; extended deterrence.**
 - **Open support for IAEA and diplomatic options key passive approach.**