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# Evolving Threats and Strategic Partnership in the Gulf

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This report is based on a series of reports by Dr. Anthony Cordesman on Iran, published by the Burke Chair, CSIS. They can be found at:

- ***Iran and the Gulf Military Balance - I: Conventional and Asymmetric Forces***, available on the CSIS web site at <http://csis.org/publication/reassessing-gulf-military-balance-part-one-conventional-and-asymmetric-forces>.
- ***Iran and the Gulf Military Balance II: The Missile and Nuclear Dimensions***, available on the CSIS web site at <http://csis.org/publication/iran-and-gulf-military-balance-ii-missile-and-nuclear-dimensions>.
- ***Iran and the Gulf Military Balance III: Sanctions, Energy Arms Control, and Regime Change***, , available on the CSIS web site at [http://csis.org/files/publication/130625\\_iransanctions.pdf](http://csis.org/files/publication/130625_iransanctions.pdf)
- ***Iran and the Gulf Military Balance IIV: The Gulf and the Arabian Peninsula***, available on the CSIS web site at [http://csis.org/files/publication/120228\\_Iran\\_Ch\\_VI\\_Gulf\\_State.pdf](http://csis.org/files/publication/120228_Iran_Ch_VI_Gulf_State.pdf)
- ***Violence in Iraq***, available on the CSIS web site at [https://csis.org/files/publication/120718\\_Iraq\\_US-Withdrawal\\_Search\\_SecStab.pdf](https://csis.org/files/publication/120718_Iraq_US-Withdrawal_Search_SecStab.pdf)

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## **Key Threats**

- **Internal ethnic and sectarian tensions, civil conflict, continued instability, failed governance and economy.**
- **Syrian civil war. Iraq, Lebanon, “Shi’ite crescent.”**
- **Sectarian warfare and struggle for future of Islam through and outside region. Sunni on Sunni and vs. Shi’ite struggles**
- **Terrorism, insurgency, civil conflict linked to outside state and non-state actors.**
- **Wars of influence and intimidation**
- **Asymmetric conflicts escalating to conventional conflicts.**
- **Major “conventional” conflict threats: Iran-Arab Gulf, Arab-Israeli, etc.**
- **Economic warfare: sanctions, “close the Gulf,” etc.**
- **Missile and long-range rocket warfare**
- **Proliferation, preventive strikes, containment, nuclear arms race, extended deterrence, “weapons of mass effectiveness”.**

# The Problem of Strategic Triage

## Major areas of concern:

- Islamic extremism and terrorism
- Iranian nuclear, conventional, and asymmetric threats.
- Syrian civil war, Iraq, Lebanon, Jordan
- Yemen and AQAP
- Egypt and Arab states caught up in political turmoil.
- Iran and Arab Gulf states
- Arab-Israeli?



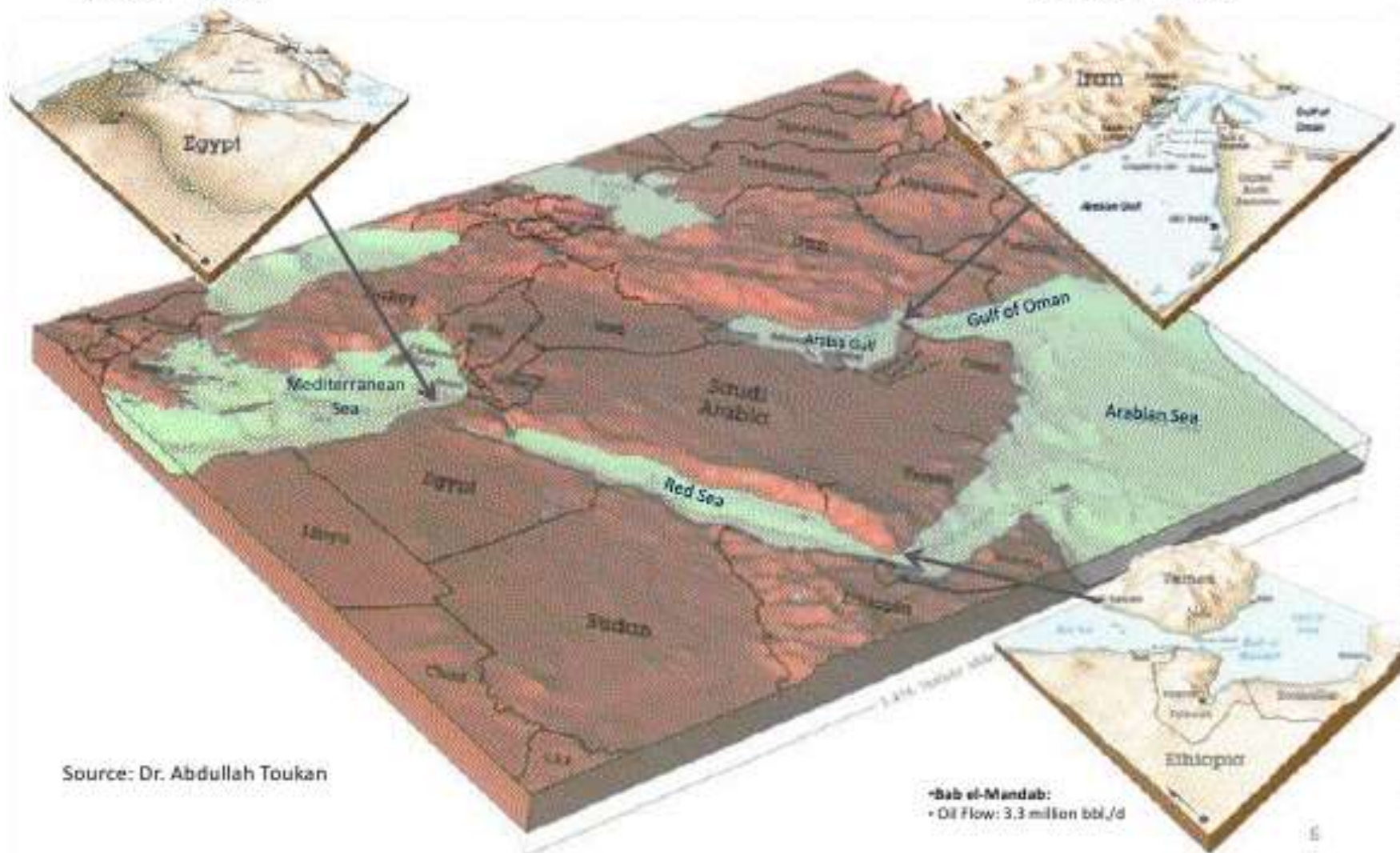
***The Gulf and Environs  
Energy is Still the Prize***



# Key Oil, Air, Sea Transit Chokepoints

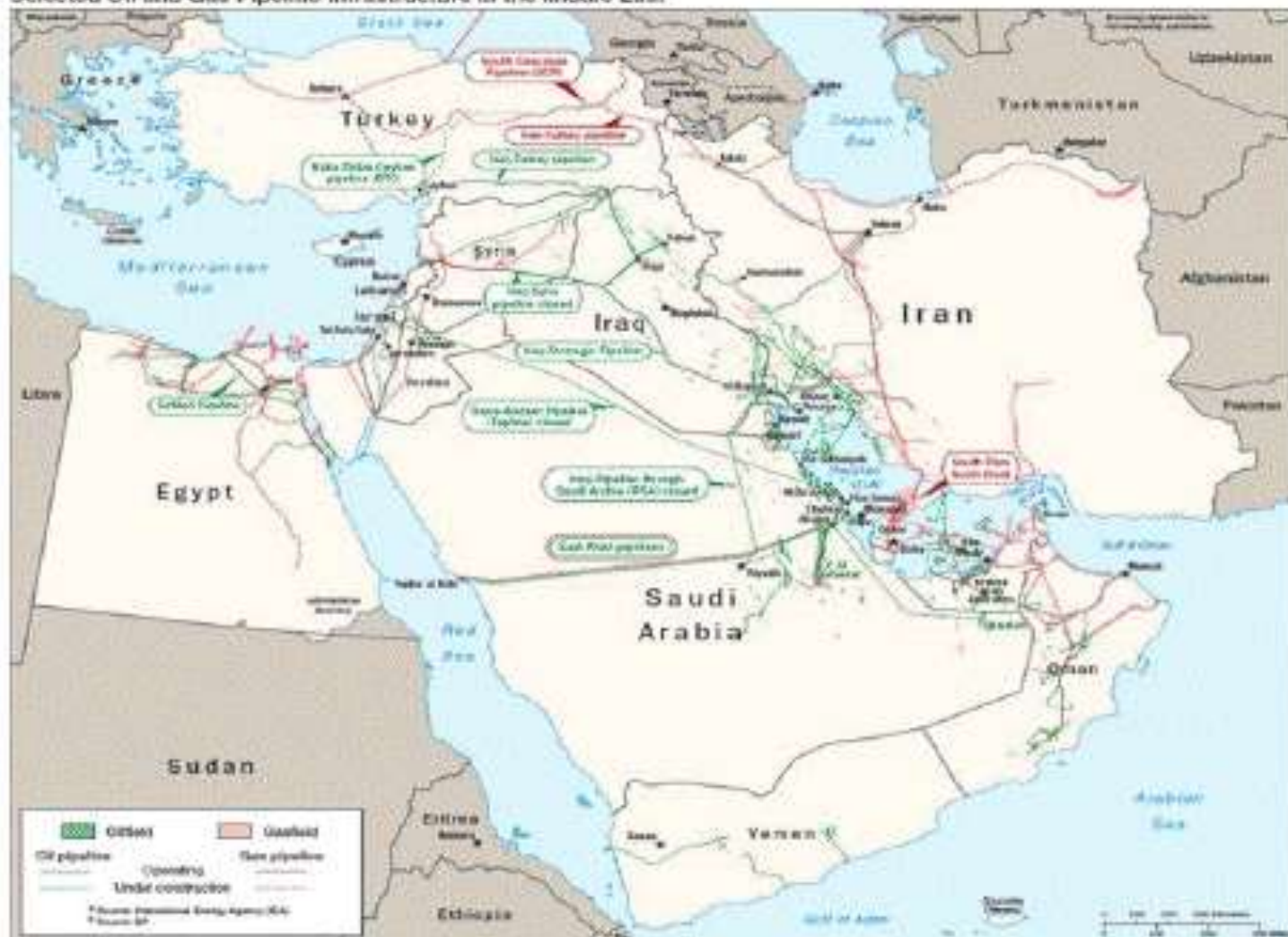
- The Suez Canal/Sumed Pipeline:
- Oil Flow: 4.5 million bbl/d

- The Strait of Hormuz:
- Oil Flow: 16.5 million bbl/d



# Gulf Overland Oil Supply Pipelines

Selected Oil and Gas Pipeline Infrastructure in the Middle East



(Source: [http://www.eia.doe.gov/emeu/rabs/Persian\\_Gulf/images/pg\\_map.pdf](http://www.eia.doe.gov/emeu/rabs/Persian_Gulf/images/pg_map.pdf))

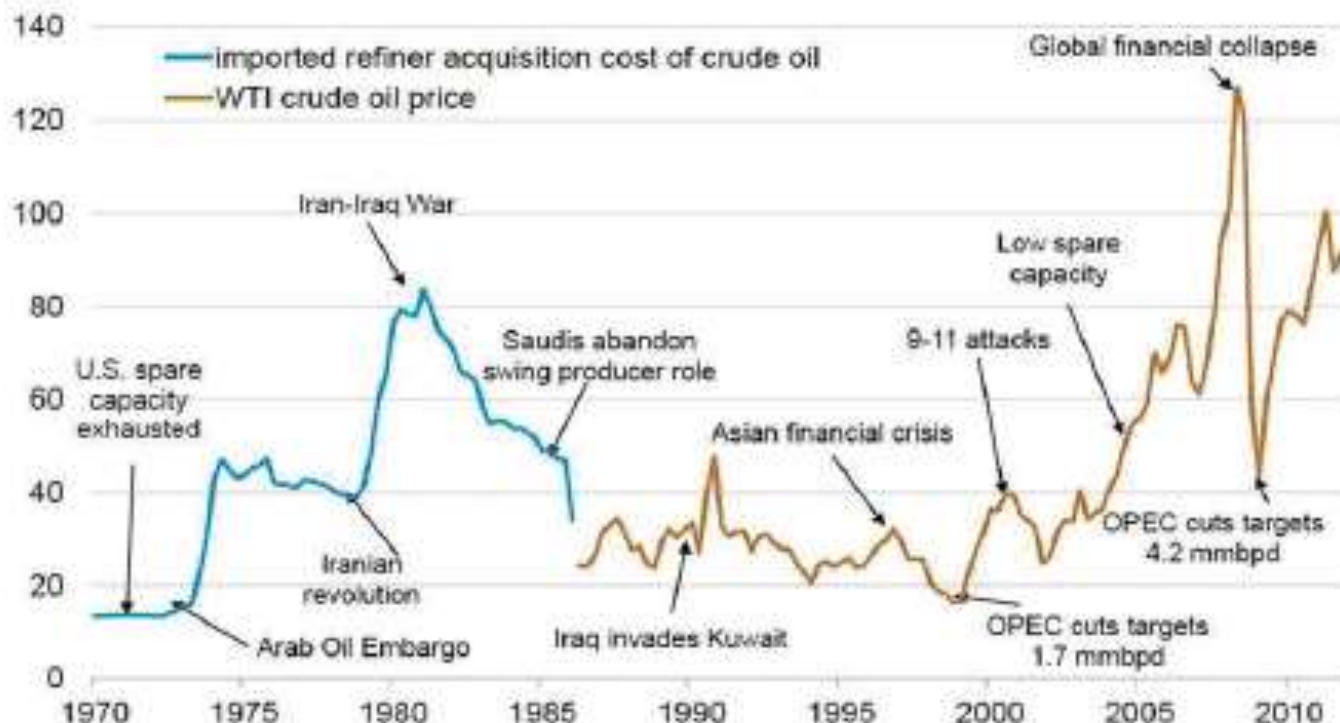


# Critical Threat to US and Global Economy

Crude oil prices react to a variety of geopolitical and economic events

price per barrel

(real 2010 dollars, quarterly average)

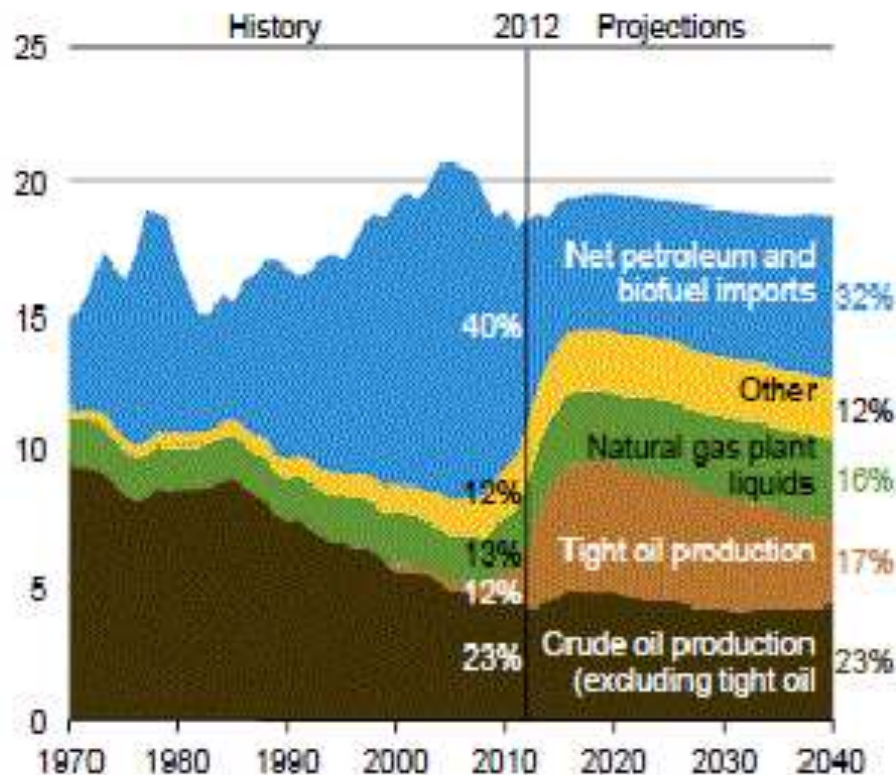


Sources: U.S. Energy Information Administration, Thomson Reuters



# No US “Energy Independence” Through 2040

U.S. petroleum and other liquid fuels supply by source, 1970-©2040 (million barrels per day)



US economy pays world energy prices in a crisis.

US steadily more dependent on overall health of global economy.

Major indirect imports of Gulf oil through Asia

- Petroleum limited share of US imports: industrial supplies 32.9% (crude oil 8.2%), capital goods 30.4% (computers, telecommunications equipment, motor vehicle parts, office machines, electric power machinery), consumer goods 31.8% (automobiles, clothing, medicines, furniture, toys)
- 30% plus of US imports come from Asia.

Sharing requirements of IAEA agreement

EIA, AEO2014 Early Release Overview, December 2013, p. 1 <http://www.eia.gov/forecasts/aeo/er/pdf/0383er%282014%29.pdf>, and CIA World Factbook, "United States," <https://www.cia.gov/library/publications/the-world-factbook/geos/us.html>.

## Gulf Oil Exports Amount to 20% of World Total Production of 87 Million Barrels a Day

Volume of Gulf oil exports amounts to some 20% of all the world's oil production of 87 million a day.



Location	2007	2008	2009	2010	2011
<b>Bab el_Mandab</b>	4.6	4.5	2.9	2.7	3.4
<b>Turkish Straits</b>	2.7	2.7	2.8	2.9	N/A
<b>Danish Straits</b>	3.2	2.8	3.0	3.0	N/A
<b>Strait of Hormuz</b>	16.7	17.5	15.7	15.9	17.0
<b>Panama Canal</b>	0.7	0.7	0.8	0.7	0.8
Crude Oil	0.1	0.2	0.2	0.1	0.1
Petroleum Products	0.6	0.6	0.6	0.6	0.6
<b>Suez Canal and SUMED Pipeline</b>	4.7	4.6	3.0	3.1	3.8
Suez Crude Oil	1.3	1.2	0.6	0.7	0.8
Suez Petroleum Products	1.1	1.3	1.3	1.3	1.4
SUMED Crude Oil	2.4	2.1	1.2	1.1	1.7

Source: EIA/DOE, *World Oil Transit Chokepoints*, August 2012, <http://www.eia.gov/countries/regions-topics2.cfm?fips=WOTC&trk=c>.

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# Currently Operable Crude Oil Pipelines that Bypass the Strait of Hormuz

If war should come while surplus pipeline capacity is still limited to the high EIA estimate of 4.3 million barrels a day – and all pipeline loading and other facilities remained secure from attack -- this would only provide 25% percent of the 17 million barrels a day flowing through the Gulf.

Pipeline	Kirkuk-Ceyhan (Iraq-Turkey) Pipeline <sup>1</sup>	Petrolina (East-West Pipeline)	Abu Dhabi Crude Oil Pipeline United Arab Emirates	Total
Owner	Iraq	Saudi Arabia		
<b>2011 (average)</b>				
Capacity	0.4	3.0	0.0	3.4
Throughput	0.4	2.0	0.0	2.4
Unused Capacity <sup>2</sup>	0.0	1.0	0.0	1.0
<b>2012 (mid-year) <sup>3</sup></b>				
Capacity	0.4	4.8	1.5	6.7
Throughput <sup>4</sup>	0.4	2.0	0.0	2.4
Unused Capacity	0.0	2.8	1.5	4.3

Notes: All estimates are EIA estimates as of August 17, 2012 and expressed in million barrels per day (mbl/d).

1 Although the Kirkuk-Ceyhan Pipeline has a nominal nameplate capacity of 1.6 million bbl/d, its effective capacity is 0.4 million bbl/d because it cannot transport additional volumes of oil until the Strategic Pipeline to which it links can be repaired to bring in additional volumes of oil from the south of Iraq.

2 "Unused Capacity" is defined as pipeline capacity that is not currently utilized and can be readily available.

3 All estimates for 2012 are rates around the mid-year point; not the forecast average for 2012.

4 The 2012 throughput rates are based off of 2011 estimates.

Source: EIA/DOE, World Oil Transit Chokepoints, August 2012, <http://www.eia.gov/countries/regionatopics2>.

5/2/12/figs-WOTC&rk=c.

*As Egypt, Syria, Iraq, Yemen, Libya,  
and Tunisia show –*

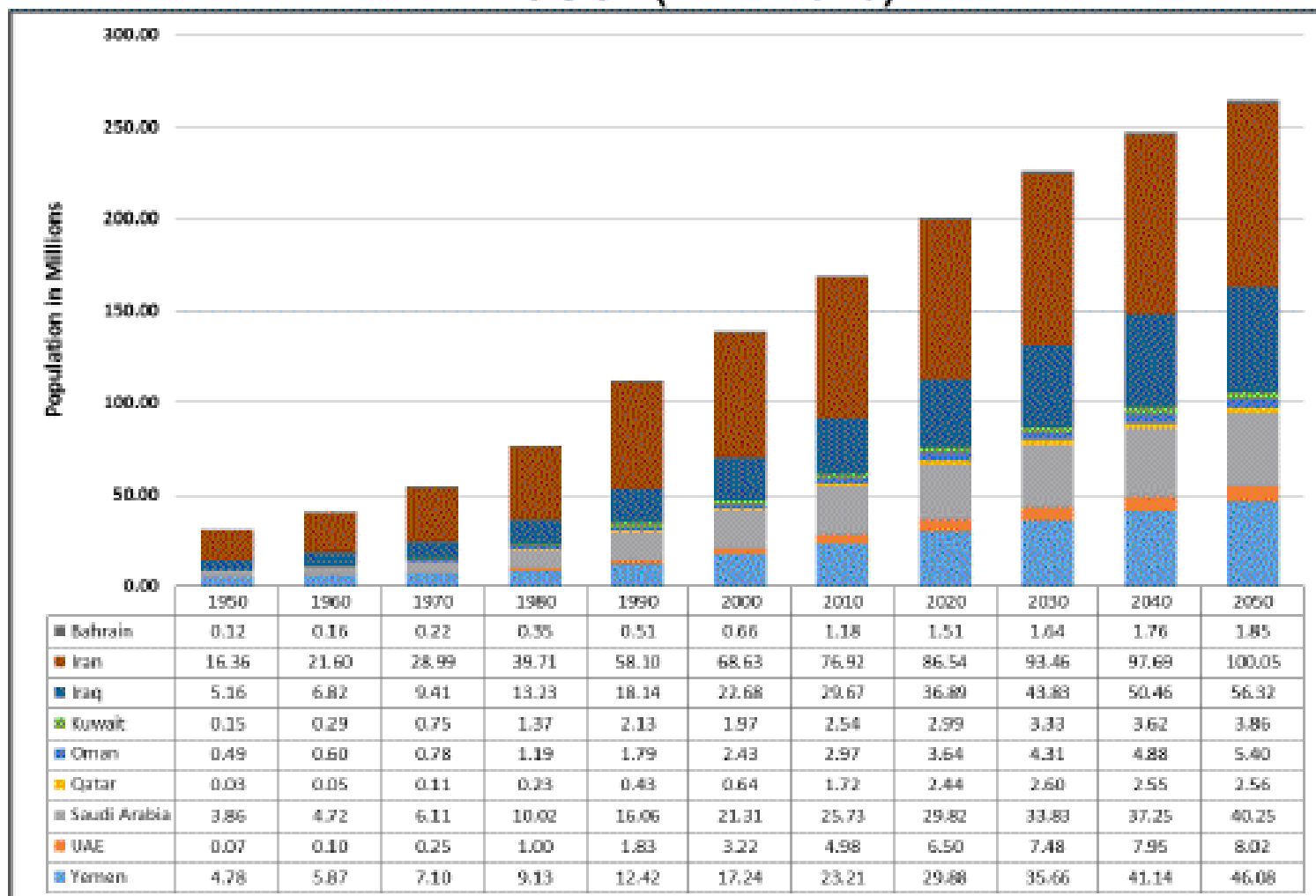
*Internal Stability is More  
Critical than External Threats*



## **Demographic Pressures**

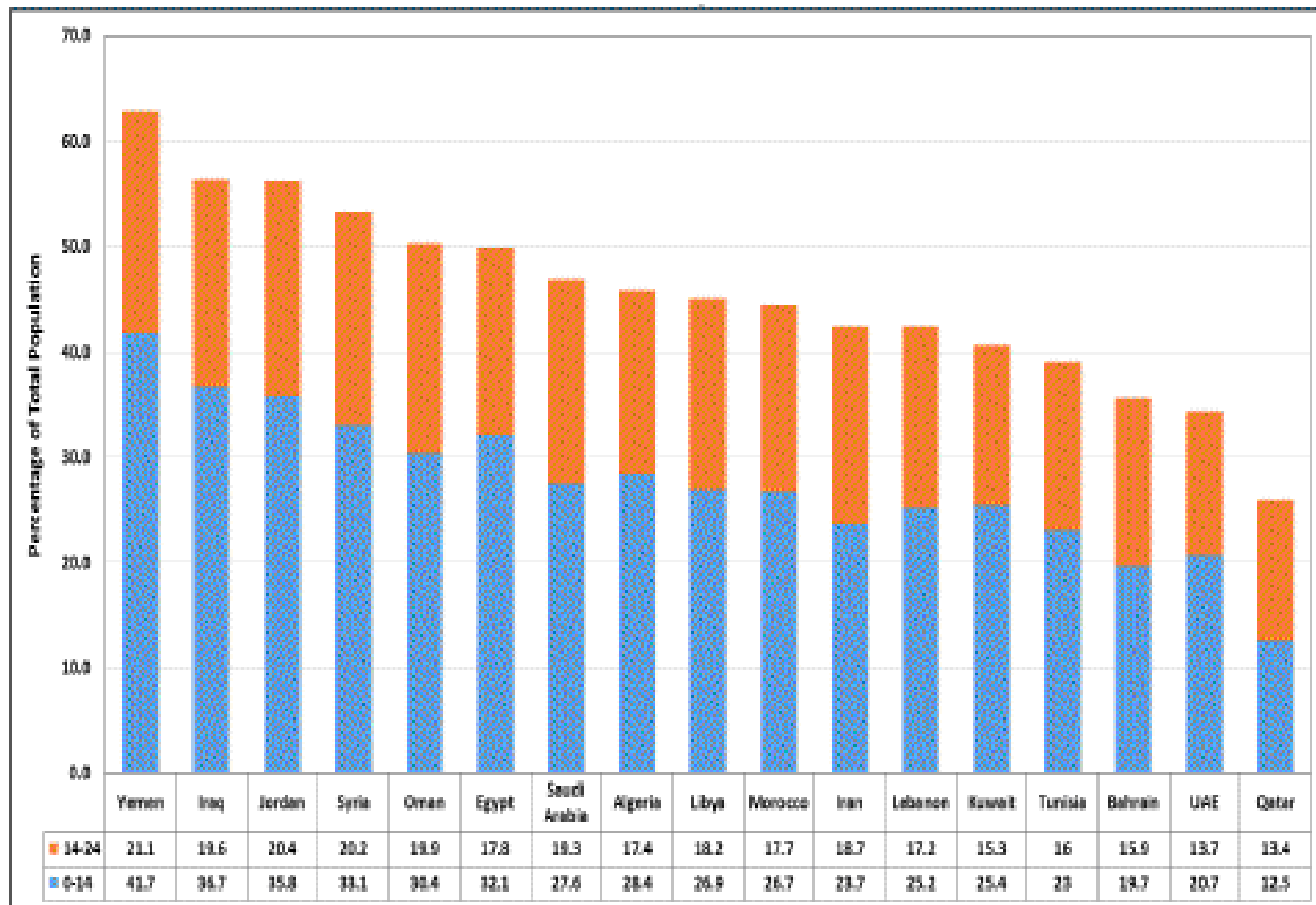
- **Massive population growth since 1950, and will continue through at least 2030.**
- **Matched by dislocation, hyperurbanization, and DP/IDP issues**
- **Broad pressure on agriculture at time need economies of scale and capital – not more farmers.**
- **Strain on all government services and infrastructure.**
- **Challenge of demographic pressure on expectations, status as important as classic economic pressures.**
  - **Failed secularism; unfairness, failed and corrupt governance.**
  - **Limits to education/health/infrastructure/water**
  - **Ethnic, sectarian and tribal pressures**
  - **Cost to leave home, marry**

# Gulf Demographic Pressure: 1950-2050 (In Millions)



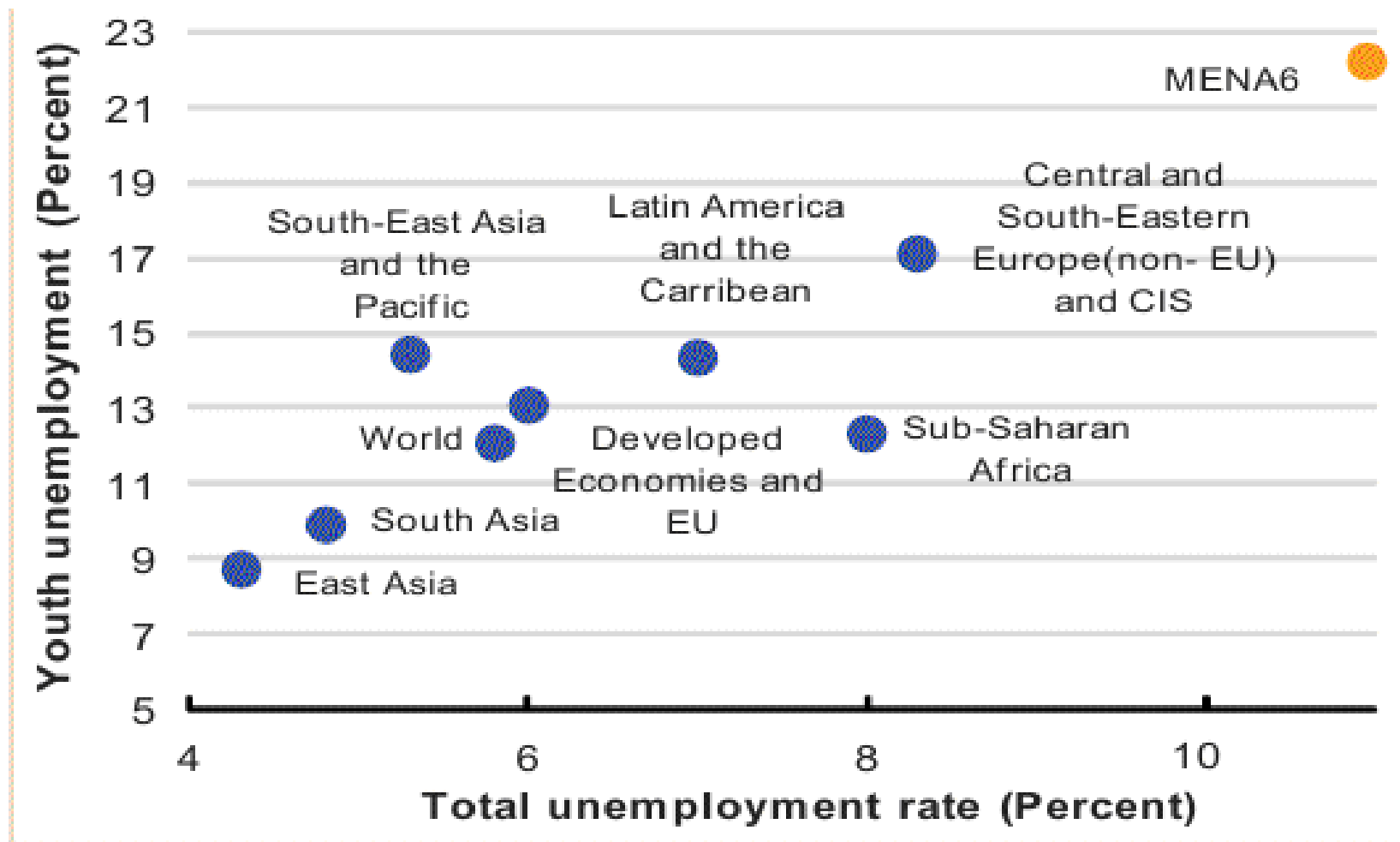
Source: United States Census Bureau, International Data Base, Accessed April 2014.  
<http://www.census.gov/population/international/data/idb/informationGateway.php>

## Demographic Pressures (Percentage of Population Below



Source: Central Intelligence Agency, World Factbook 2014, Accessed April 2014,  
<https://www.cia.gov/library/publications/the-world-factbook/>

## Total and Youth Unemployment Rates by Region (2008)



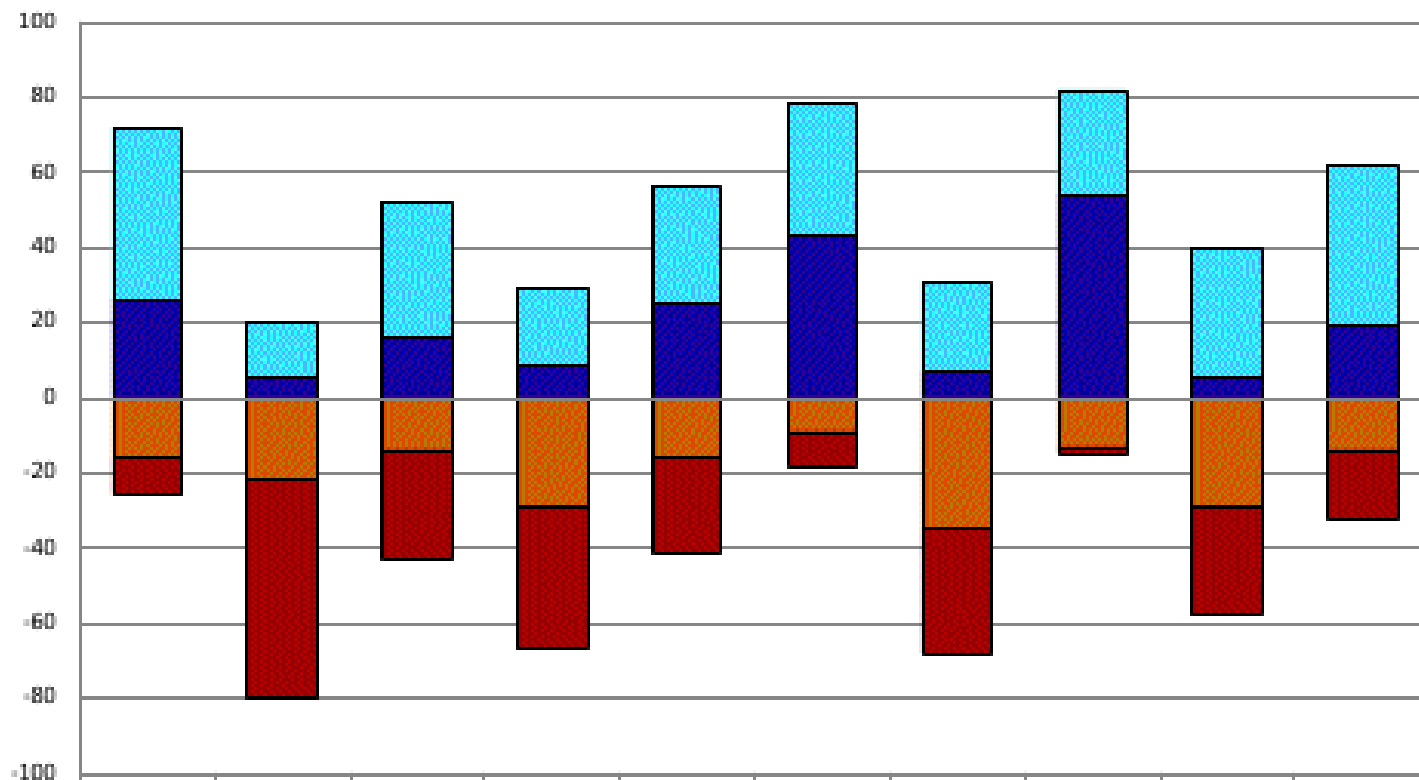


# Popular Perceptions of State Institutions:

## Popular Trust in the Government (Cabinet)

\* Limited-No Trust  
Denoted by Negative  
Numbers

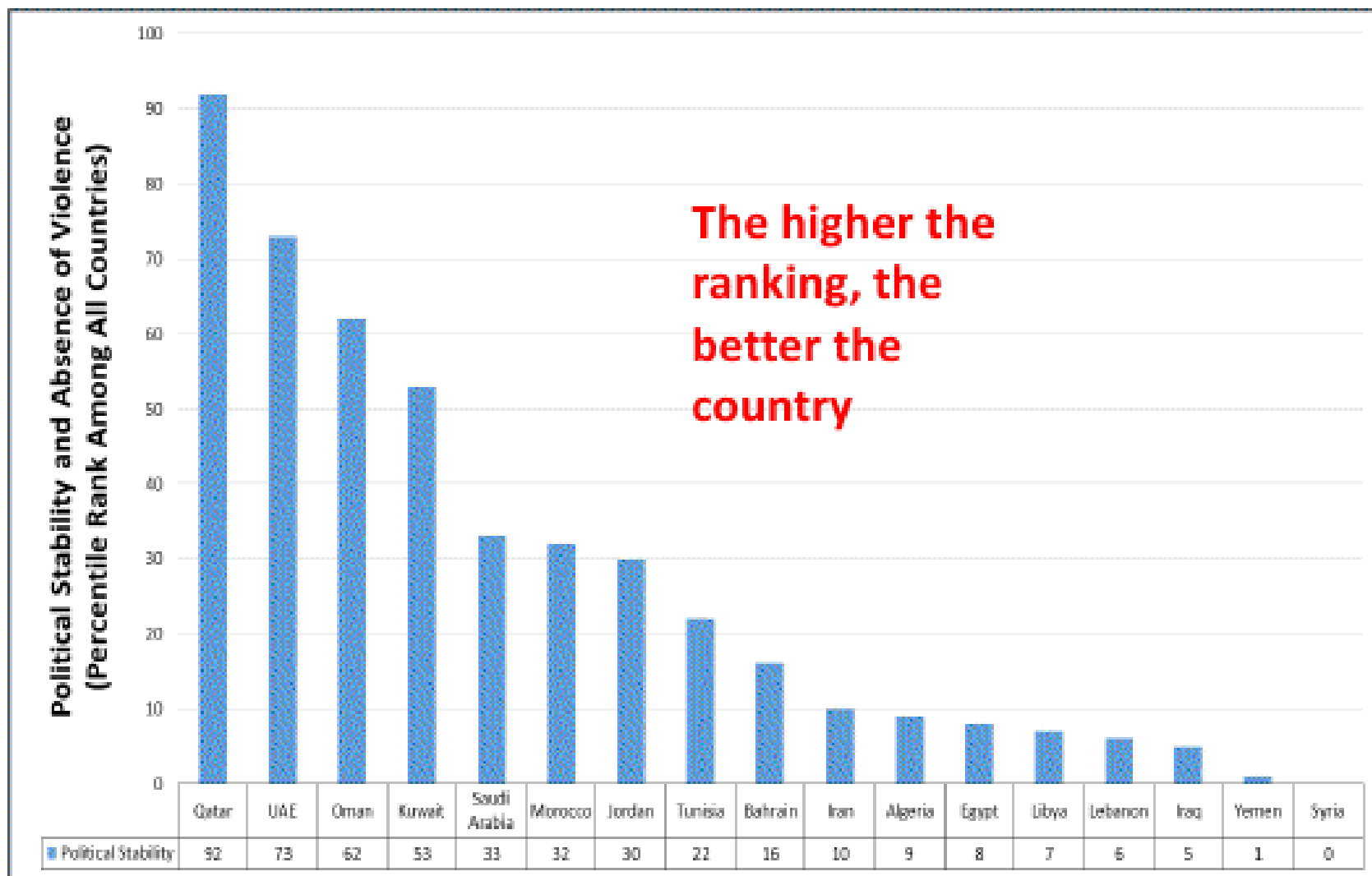
Percentage of Respondents  
(Negative symbols represent negative opinions)



	Jordan	Lebanon	Palestine	Yemen	Sudan	Egypt	Algeria	Saudi Arabia	Iraq	Tunisia
I absolutely do not trust it	-10	-58	-29	-38	-25	-9	-33	-2	-29	-18
I trust it to a limited extent	-16	-22	-14	-29	-16	-9	-35	-13	-29	-14
I trust it to a medium extent	46	15	36	20	31	35	24	28	35	43
I trust it to a great extent	26	5	16	9	25	43	7	54	5	19

# Political Stability and Absence of Violence

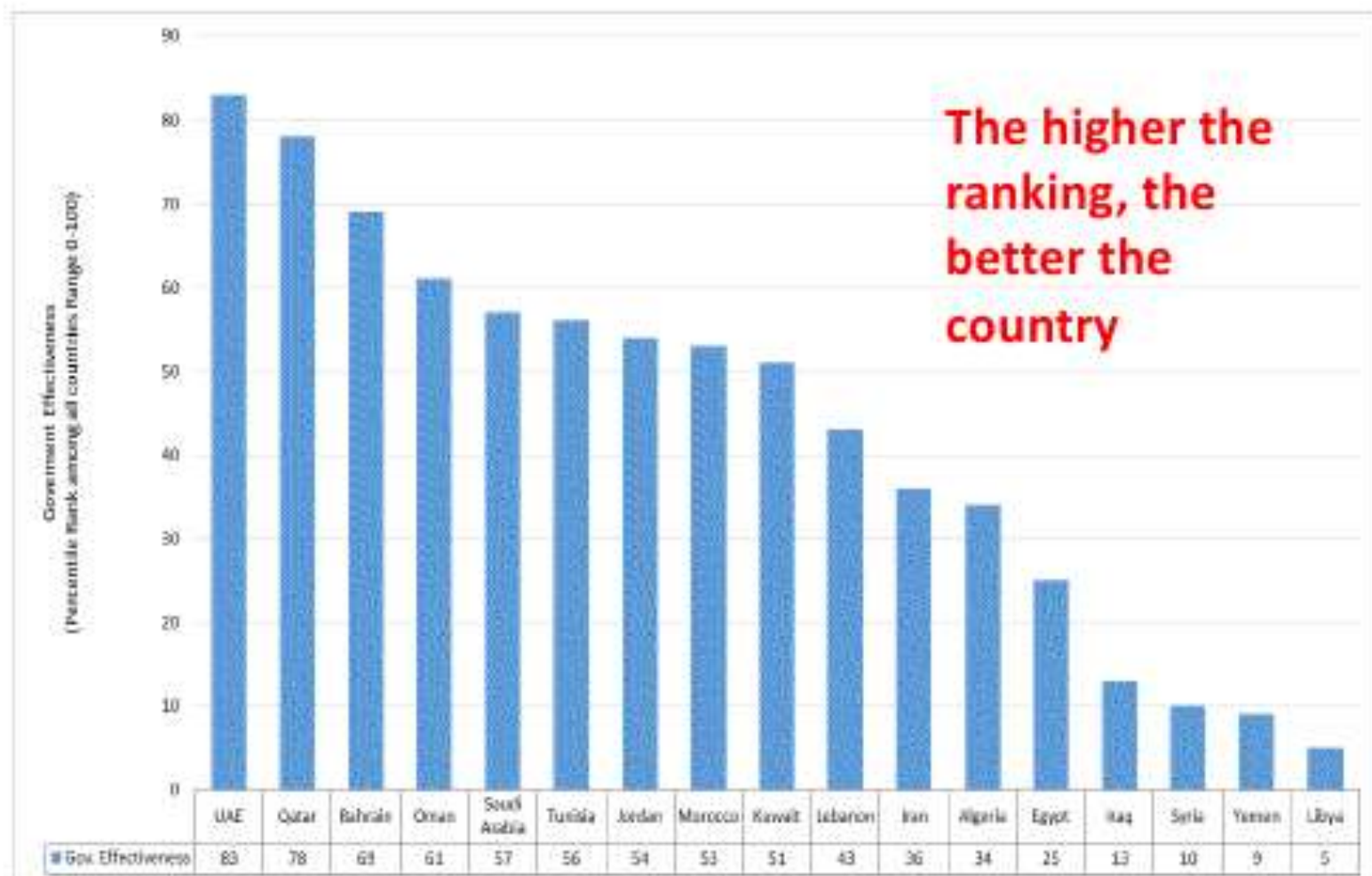
(Percentile Rank Among All Countries)



Source: World Bank Governance Indicators, Accessed April, 2014.

<http://info.worldbank.org/governance/wgi/index.aspx#home>

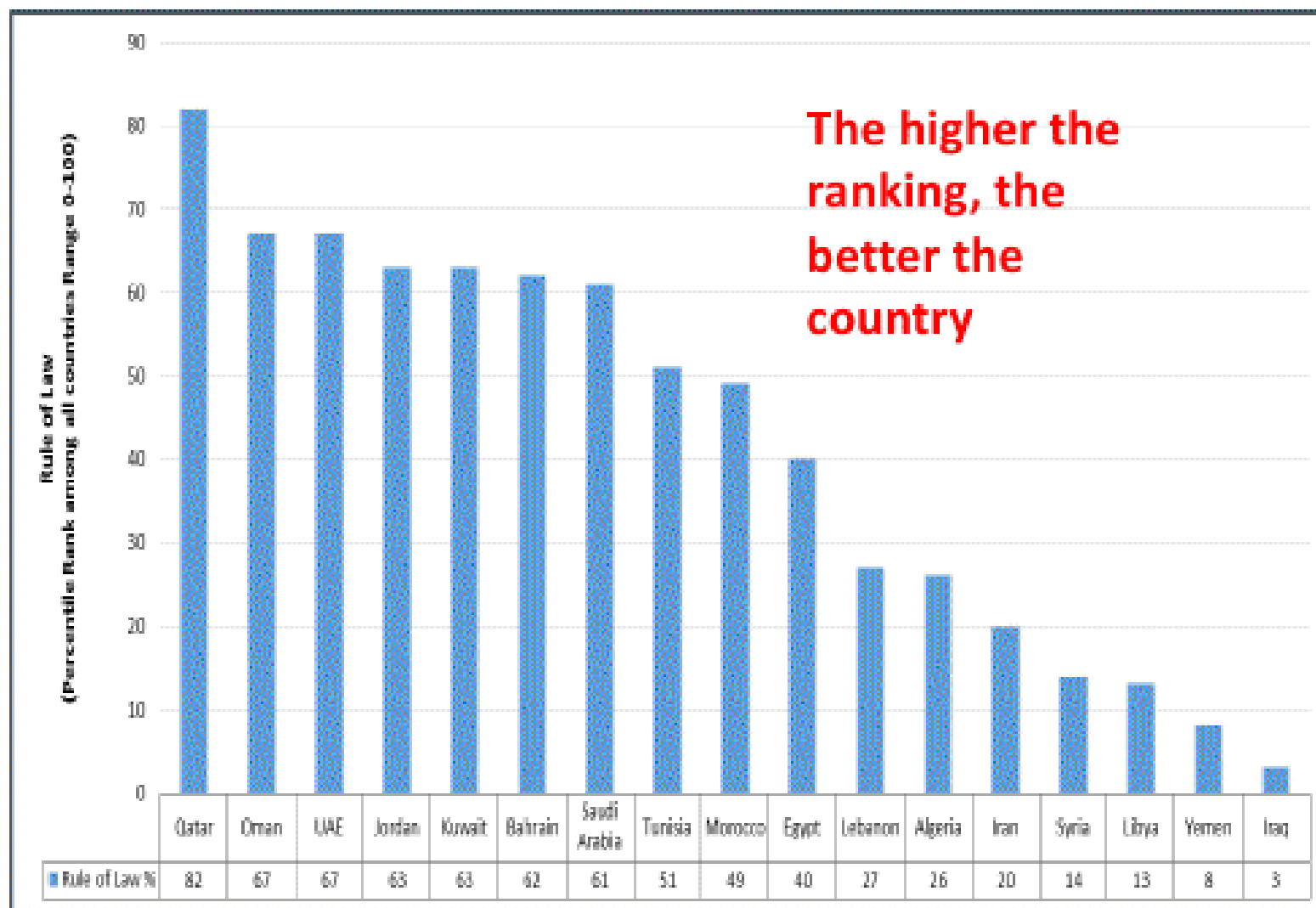
## Government Effectiveness (Percentile Rank among all countries)



Source: World Bank Governance Indicators, Accessed April, 2014,  
<http://info.worldbank.org/governance/wgi/index.aspx#home>

# Rule of Law

(Percentile Rank among all countries)

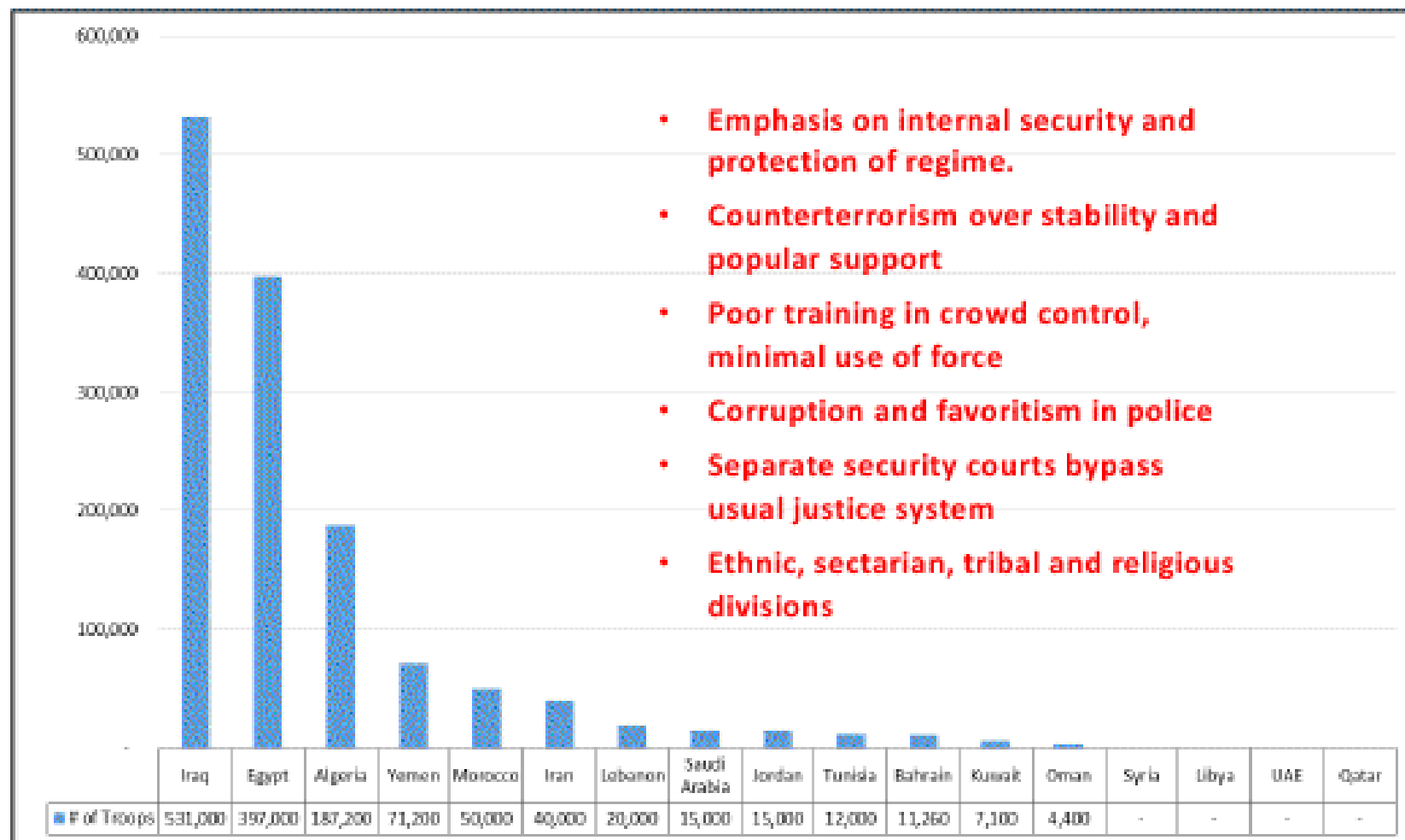


Source: World Bank Governance Indicators, Accessed April, 2014.

<http://info.worldbank.org/governance/wgi/index.aspx#home>

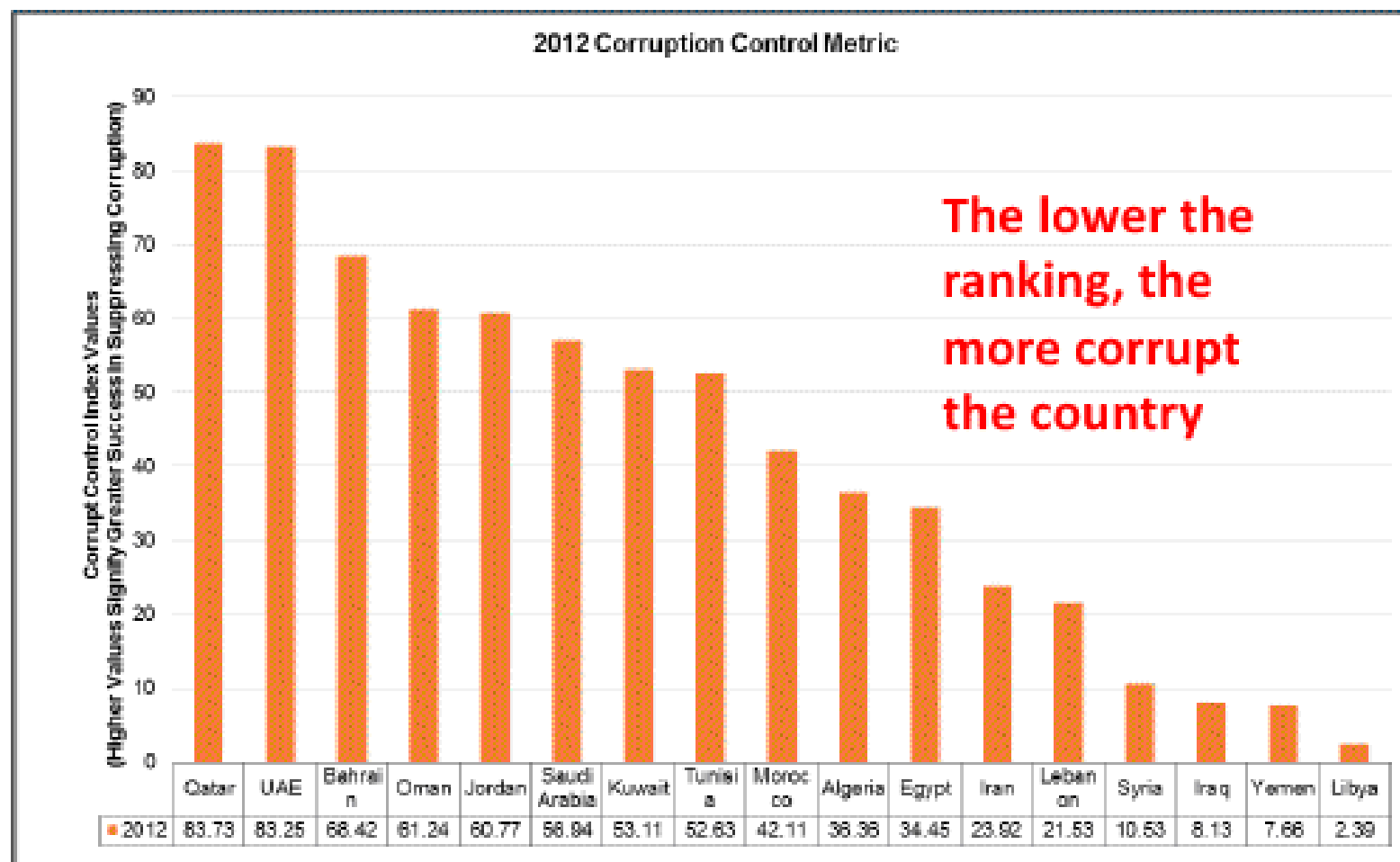


# Excessively Large Paramilitary and National Security Forces



Source: IISS, *Military Balance 2014*, Adapted by Anthony Cordesman, Garrett Bernsen, and Tyler Duhamme.

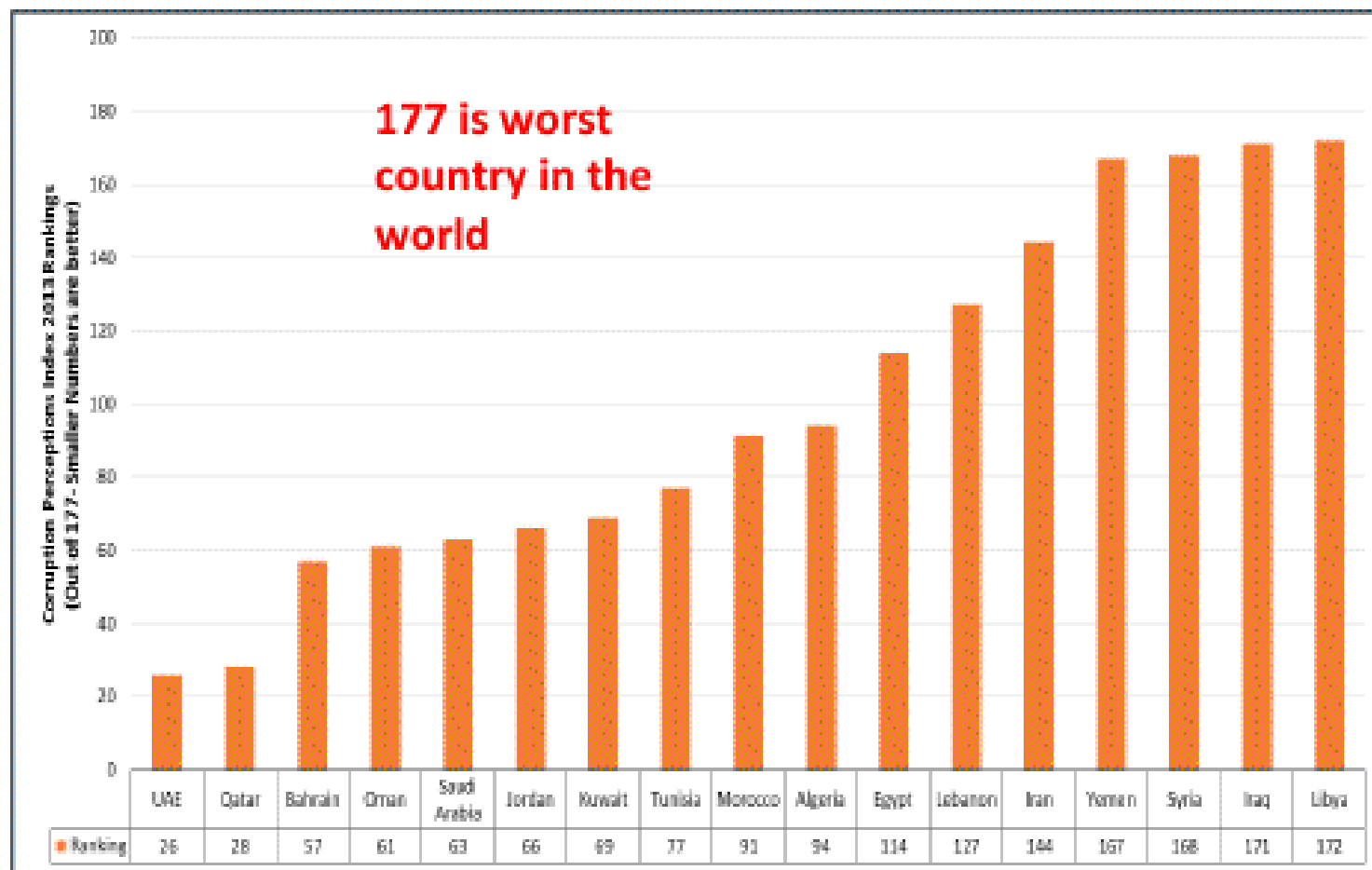
# Control of Corruption (by world percentile)



**Control of Corruption:** This World Bank ranking summarizes the views of think tanks, non-governmental organizations, international organizations, private sector firms, citizens, and experts on the control of corruption in each country.

Source: World Bank Governance Indicators, Accessed April, 2014. <http://info.worldbank.org/governance/wgi/index.asp>

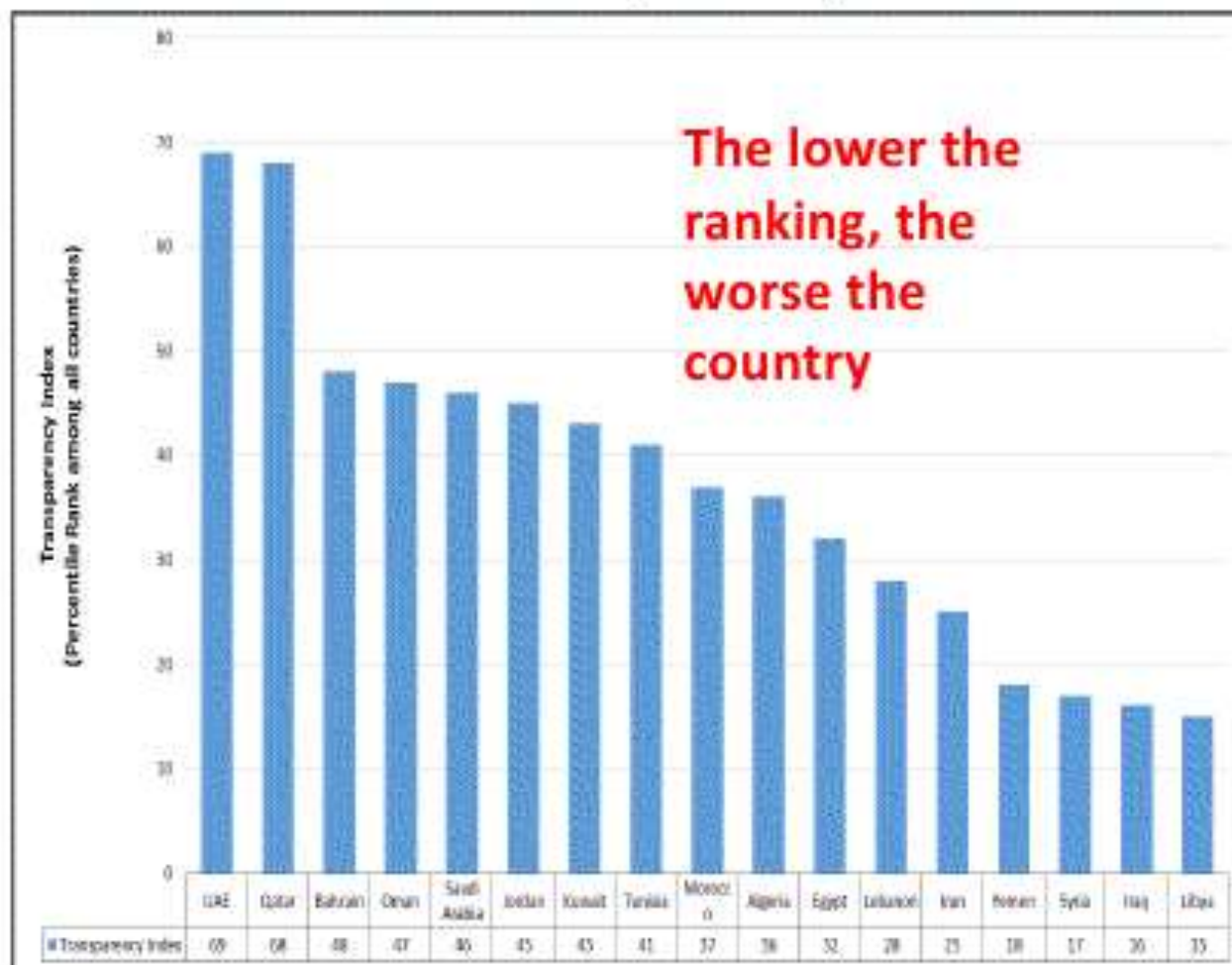
## Transparency International Corruption Perceptions Ranking (Out of 177)



Transparency International Corruption Perceptions Index "The Corruption Perceptions Index ranks countries and territories based on how corrupt their public sector is perceived to be."

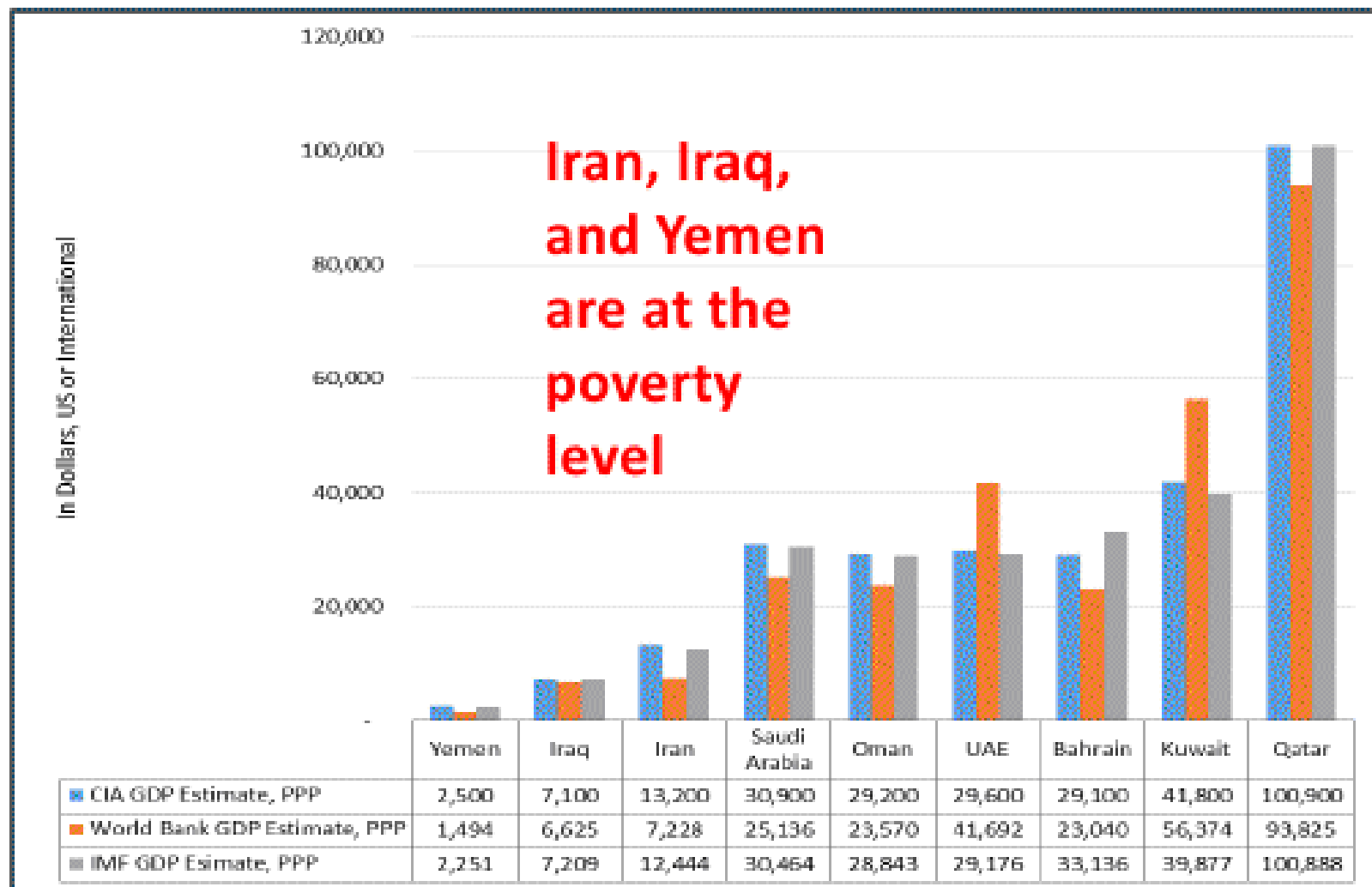
Source: Transparency International Corruption Perceptions Index, Accessed April 2014. <http://cpi.transparency.org/cpi2013/results/>

# Transparency International Transparency Index



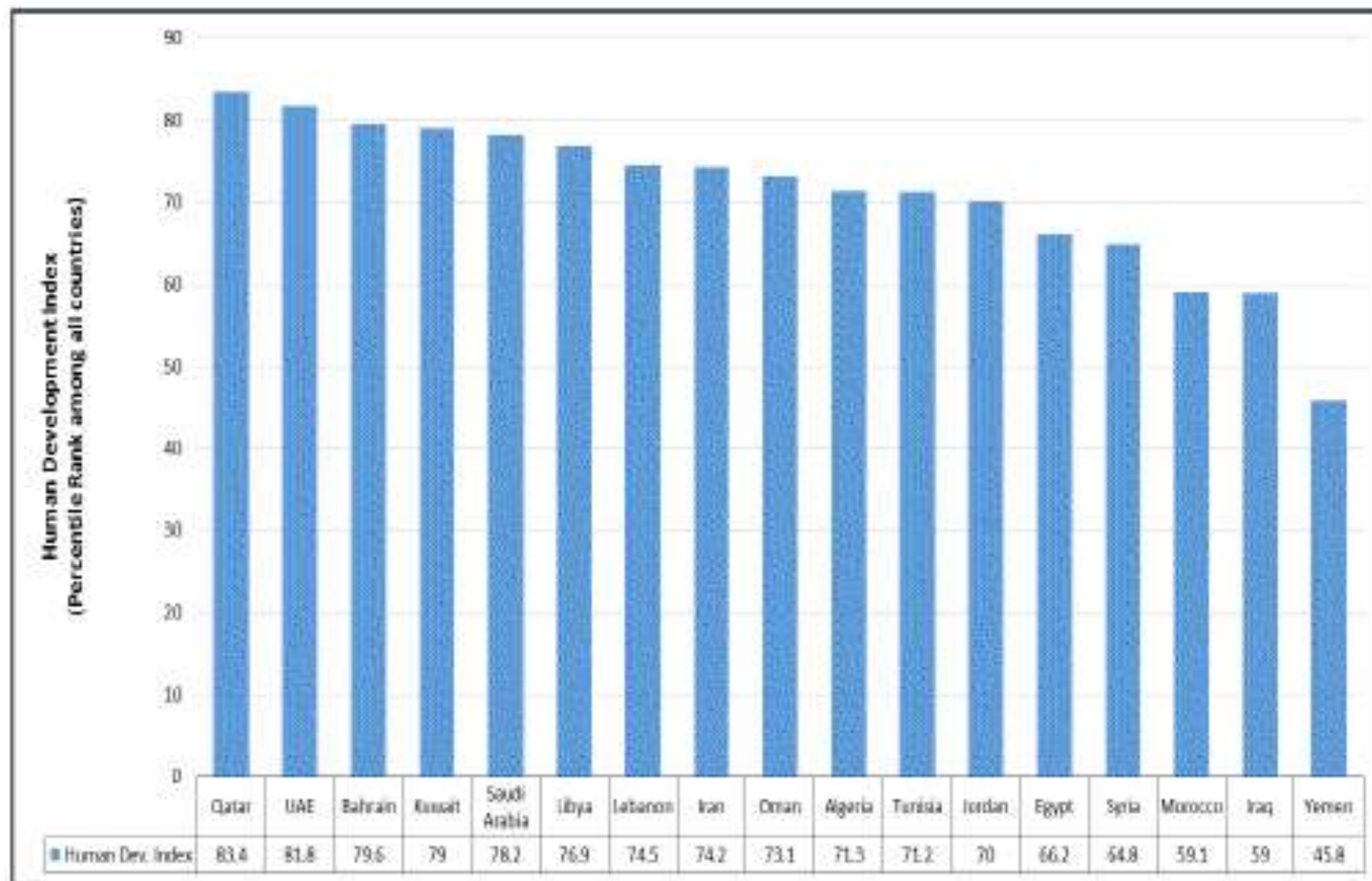
Transparency International Corruption Perceptions Index "The Corruption Perceptions Index ranks countries and territories based on how corrupt their public sector is perceived to be."

# Gulf GDP Per Capita by Country



Sources: World Bank Indicators: GDP Per Capita, <http://data.worldbank.org/indicator/NY.GDP.PCAP.CD>  
 CIA World Factbook, <https://www.cia.gov/library/publications/the-world-factbook/>  
 International Monetary Fund, <http://www.imf.org>  
 Accessed April, 2014.

# Human Development Index



**Human Development Index** \*is a composite statistic of life expectancy, education, and income indices used to rank countries into four tiers of human development.\*

Sources: United Nations Human Development Report, Accessed April 2014: <http://hdr.undp.org/en/2013-report>

# Sunni on Sunni and Sunni-Shi'ite Power Struggles



- Sectarian conflict now extends from India to Lebanon.
- Hazara major issue in Afghanistan and Pakistan.
- Iran is key Shi'ite actor – but “Persian” as well as “Twelver.”
- Fear/Hope of Iran-Iraq-Syria-Lebanon “Shi'ite” Axis.
- Bahrain and Saudi Eastern Province.
- Yemen: Houthi and other Shi'ite elements.
- No unity in Sunni attitudes: range from tolerance to treating Shi'ite as Apostate.
- Shi'ites divided by sect. Alewites in Syria only marginally Shi'ite

Post-Al Qa'ida and WOT clash within a civilization

## Key Shi'ite Actors

- Iran Al Quds Force and MOIS
- Lebanese Hezbollah
- Syrian Alewites
- Iraqi Government, Sadrists, Asaib Ahl al-Haq
- Yemeni Houthi
- Afghan and Pakistani Hazara



***US Strategy Gives Equal Priority to  
Middle East and Asia and Key in  
Gulf is US Power Projection  
Capability***

# Secretary Hagel on the US Commitment to the Gulf - I

*We have a ground, air and naval presence of more than 35,000 military personnel in and immediately around the Gulf. Two years after our drawdown from Iraq, the U.S. Army continues to maintain more than 10,000 forward-deployed soldiers in the region, along with heavy armor, artillery, and attack helicopters to serve as a theater reserve and a bulwark against aggression.*

We've deployed our most advanced fighter aircraft throughout the region, including F-22s, to ensure that we can quickly respond to contingencies. Coupled with our unique munitions, no target is beyond our reach.

We've deployed our most advanced intelligence, surveillance and reconnaissance assets to provide a continuous picture of activities in and around the Gulf. And we have fielded an array of missile defense capabilities, including ballistic missile defense ships, Patriot batteries, and sophisticated radar.

As part of our efforts to ensure freedom of navigation throughout the Gulf, we *routinely maintain a naval presence of over 40 ships in the broader region, including a carrier strike group, and conduct a range of freedom of navigation operations. These operations include approximately 50 transits of the Strait of Hormuz over the past six months.*

Earlier this year, we ramped up our minesweeping capabilities and added five coastal patrol ships to our fleet in this region. We are currently working on a \$580 million construction program to support the expansion of Fifth Fleet capabilities.

Yesterday, I visited the Navy's *new afloat forward staging base, the USS Ponce*, a unique platform for special operations, as well as humanitarian assistance and disaster relief in areas where we do not have a permanent fixed presence. I'll also be meeting with U.S. personnel stationed at *the Combined Air Operations Center in Qatar*, where we have representatives from our GCC partners training and working together with us. We also maintain forces and assets at home and around the world ready to deploy to the region on a moment's notice.

The United States military has made this commitment in resources, personnel and capabilities because of our nation's deep and enduring interest in the Middle East. That will not change. Although the Department of Defense is facing serious budget constraints, we will continue to prioritize our commitments in the Gulf, while making sure that our military capabilities evolve to meet new threats. Even with new budgetary constraints, *the United States will continue to represent nearly 40 percent of global total spending.* The U.S. military will remain the most powerful in the world, and we will honor our commitments, and the United States is not retreating, not retreating from any part of the world.

# Secretary Hagel on the US Commitment to the Gulf -II

A key vehicle for increasing partner capabilities is foreign military sales and financing. Over the last 20 years, the sale of advanced weapons has helped to shift the military balance in the region away from Iran and in favor of our Gulf partners, and this shift is accelerating. ***DOD has approved more than \$75 billion in U.S. arms sales to GCC states since 2007. These sales during the past six years are worth nearly as much as those made previously totally in the previous 15 years.***

***During my last trip to the region, we finalized agreements with nearly \$11 billion that will provide access to high-end capabilities, including F-15s, F-16s, and advanced munitions, such as standoff weapons.*** These are the most advanced capabilities we have ever provided -- ever provided to this region. We'll continue to ensure that all of our allies and partners in the region, including both Israel and the Gulf states, have these advanced weapons.

Upgrades in military hardware have enabled the United States military to work more closely, more effectively with our partners and allies in a wide variety of joint exercises, training, and collaborative planning. American men and women in uniform, serving alongside the soldiers, sailors, and airmen of our partners in the region, are staring down the same threats, which is why we take these activities very seriously.

This year, our successful training efforts have included: ***Our Eagle Resolve*** exercise, which began as a seminar in 1999. This year, hosted by Qatar, it included naval, land and air components. It included 12 nations, 2,000 U.S. soldiers, sailors, airmen and Marines, and 1,000 of their counterparts. Our Eager Lion exercise in Jordan this year involved 8,000 personnel from 19 nations, including 5,000 Americans from across the services. And here in Bahrain in May, U.S. Naval Forces Central Command hosted the International Mine Countermeasures Exercise, which included 40 nations, 6,000 service members, and 35 ships across 8,000 nautical miles, stretching from the Gulf to the Strait of Hormuz.

***... The United States supports this vision and is committed to supporting the GCC as an anchor for regional stability. The United States will continue to work closely with each of our partners in the GCC, but we must remain together, and we must do more to strengthen multilateral defense cooperation...In support of that goal today, I'm announcing several new initiatives.***

First, in addition to our Gulf-wide joint exercises and training, DOD will work with the GCC on better integration of its members' ***missile defense capabilities. We applaud the efforts of many Gulf states to acquire new and enhanced missile defense capabilities in the face of growing regional missile threat.***

# Secretary Hagel on the US Commitment to the Gulf -III

But the United States continues to believe that a multilateral framework is the best way to develop interoperable and integrated regional missile defense. Such defenses are the best way to deter and, if necessary, defeat coercion and aggression.

To encourage this, we propose upgrading our regular air and air defense chiefs conference to include missile defense cooperation as a very distinct agenda item. We believe doing so will allow for continued progress in missile defense and will open the door to broader cooperation and burden-sharing within the GCC.

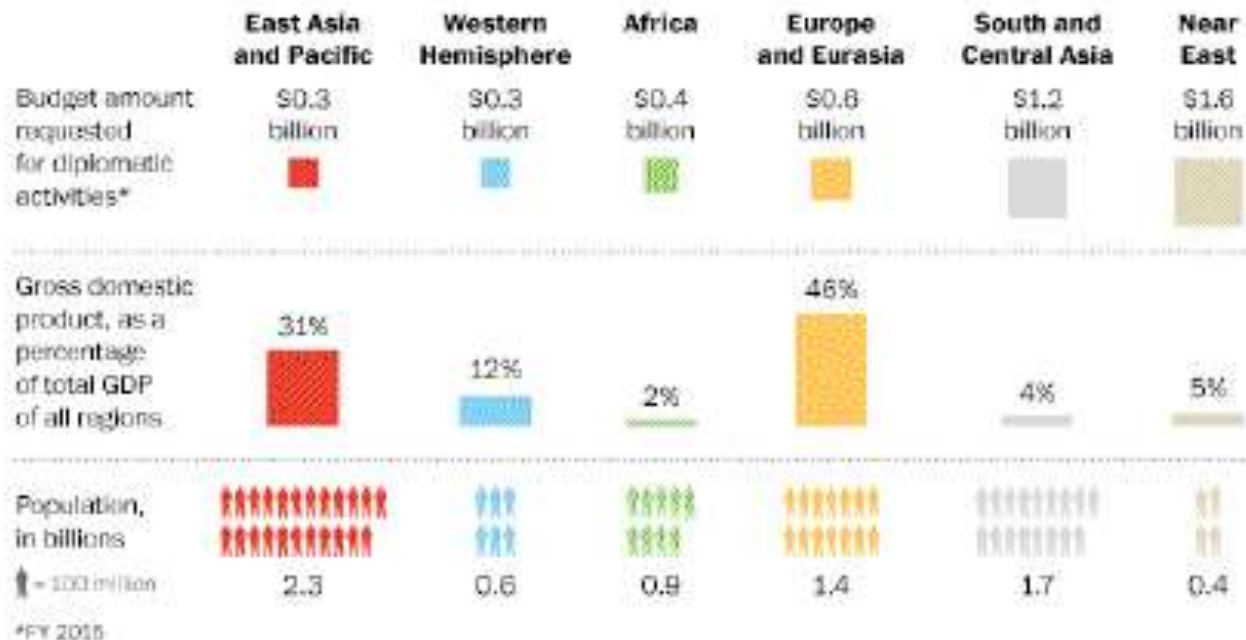
***Second, we would like to expand our security cooperation with partners in the region by working in a coordinated way with the GCC, including through the sales of U.S. defense articles through the GCC as an organization. This is a natural next step in improving U.S.-GCC collaboration, and it will enable the GCC to acquire critical military capabilities, including items for ballistic missile defense, maritime security, and counterterrorism.***

And, third, building on both this event and the U.S.-GCC Strategic Cooperation Forum, ***I'm inviting our GCC partners to participate in an annual U.S.-GCC Defense Ministerial. This ministerial will affirm the United States' continued commitment to Gulf security, and it will allow the U.S. and GCC member nations to take the next step in coordinating our defense policies and enhancing our military cooperation.*** I propose that our inaugural ministerial take place within the next six months. All of these new and ongoing initiatives will help strengthen the GCC and strengthen regional security.

Secretary of Defense Chuck Hagel, *I/SS Manama Dialogue*, As Delivered by Secretary of Defense Chuck Hagel, Manama, Bahrain, Saturday, December 07, 2013.

<http://www.defense.gov/Speeches/Speech.aspx?SpeechID=1824>.

# US Diplomatic Emphasis on Middle East



DIPLOMATIC BUREAUS



David Nakamura, "US Pivot to Asia falls Short," *Washington Post*, 17.4.14, [http://www.washingtonpost.com/politics/us-diplomatic-funding/2014/04/16/f9613164-c5cd-11e3-9f37-7ce307c56815\\_graphic.html](http://www.washingtonpost.com/politics/us-diplomatic-funding/2014/04/16/f9613164-c5cd-11e3-9f37-7ce307c56815_graphic.html)

# US Forces In the Gulf in 2014: Part I

The US forces that defend the Gulf and cover the western IOR, focus on the entire for the Middle East and are assigned to USCENTCOM. They include the forces the US deploys in support of the Gulf states, Jordan, Egypt, and the Red Sea states.

The level of these forces varies with the level of tension or conflict in the region, and is drawn from US forces in the US, in Europe and in the Pacific. The forces actually and deployed by USCENTCOM vary according to the contingency commitments the US makes in the CENTCOM region at any give time – a region which goes far beyond the IOR and extends from Egypt to Afghanistan and Pakistan.

These contingency commitments have changed steadily over the last decade and US forces are now phasing out of active combat. The size of troop deployments, for example, has been steadily cut since the last US combat troops left Iraq at the end of 2011, and is dropping further as the US transitions combat forces out of Afghanistan – with all to be removed by the end of 2014.

The US does, however, still maintain a major air-sea force as part of its 5<sup>th</sup> Fleet, which is headquartered in Bahrain. The US Navy has maintained a presence in the Gulf since 1949, has had facilities in Bahrain since 1971, and created the 5<sup>th</sup> Fleet in in 1995. In January 2014, the 5<sup>th</sup> Fleet had the following task forces:

- CTF-50 Strike Forces: 1 carrier, 1 cruiser, 1 Arleigh Burke-class destroyer, 1 frigate, 1 replenishment ship.
- CTF-51 Contingency Response: 1 LHD, 1 LHA, 2 LSDs, 1 AV-8B squadron, 2 helicopter units, one AH-1W attack helicopter unit.
- CTF-52 Mine Warfare: 1 MCM, 1 MH-53 helicopter unit.
- CTF-53 Logistics: 1 ammo ship, 1 logistic stores ship, 1 fast combat support ship, 1 dry cargo/ammo ship, 1 fleet replenishment oiler.
- CTF-54: 1 Ohio-class guided missile submarine, 1 Los Angeles-class submarine,
- CTF-55 Surface forces: US Navy and US Coast Guard patrol ships.

CTF-56 Expeditionary Forces: support for rapid power projection. EOD, marine mammals, inshore boats, riverine warfare,

CTF-57 Maritime Patrol Aircraft: P-3C Orion and ASW aircraft.

# US Forces In the Gulf in 2014 - Part II

The overall US Army and US Air Force presence in the Gulf/Western IOR region is harder to quantify. The US had approximately 25,000 personnel in the area for all services in 2013, and major air facilities in Kuwait, Bahrain, Qatar, and the UAE. It also has a major air base and command facility at Al Udeid Air Force Base in Qatar called the Combined Air and Space Operations Center (COAC), and prepositioning and contingency facilities in Oman. The USAF had six air wings deployed in or near the IOR and two groups:

- [376th Air Expeditionary Wing Transit Center at Manas, Kyrgyzstan](#)
- [379th Air Expeditionary Wing, Al Udeid Air Base, Qatar](#)
- [380th Air Expeditionary Wing, Undisclosed Location, Southwest Asia](#)
- [386th Air Expeditionary Wing, Undisclosed Location, Southwest Asia](#)
- [438th Air Expeditionary Wing, Kabul International Airport, Afghanistan](#)
- [455th Air Expeditionary Wing, Bagram Airfield, Afghanistan](#)
- [609th Air and Space Operations Center, Undisclosed Location, Southwest Asia](#)
- [1st Expeditionary Civil Engineer Group, Undisclosed Location, Southwest Asia](#)

It is not possible to separate out aircraft numbers or activity levels for the Gulf from the entire range of USAF air activity in the Central Region – which included Afghanistan. Total AFCENT activity in Afghanistan in 2013 does, however, provide a rough indication of US power projection and surge capabilities. The US flew over 21,000 close air support sorties, 31,000 IS&R sorties, 32,000 airlift sorties, and 12,000 tanker sorties – levels far lower than in the peak of the Iraq and Afghan Wars. These numbers illustrate the fact that airpower in the Gulf area at any given time is not a measure of US capability for a rapid deployment force. US 5th Fleet,

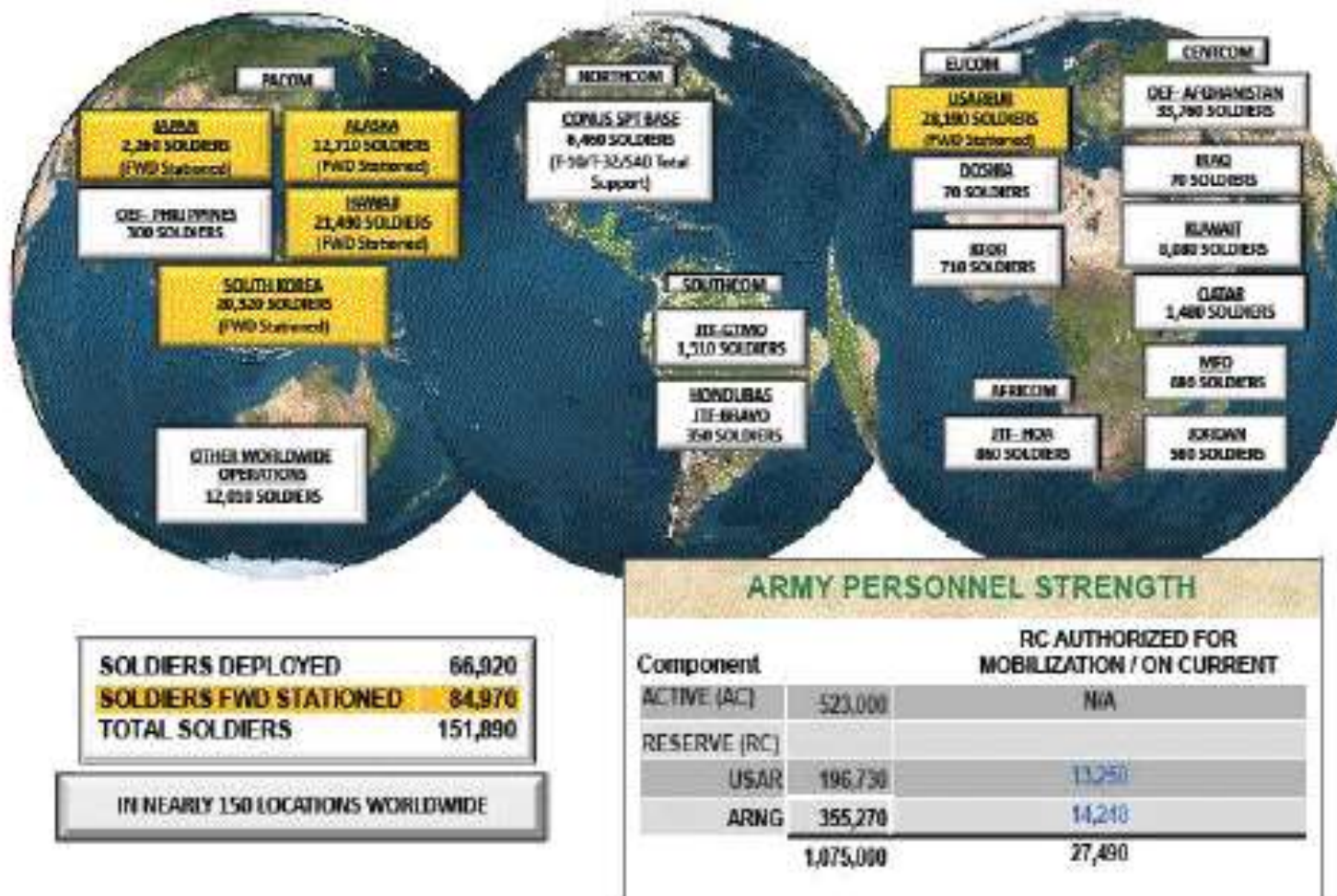
Source: "U.S. 5th Fleet, U.S. Naval Forces Central Command," Home Page, accessed January 4, 2014, <http://www.cusnc.navy.mil/taskforces.html>; Thom Shanker, "Hagel Lifts Veil on Major Military Center in Qatar," New York Times, December 11, 2013, <http://www.nytimes.com/2013/12/12/world/middleeast/hagel-lifts-veil-on-major-military-center-in-qatar.html>. AFCENT, <http://www.centaf.af.mil/units/index.asp>.



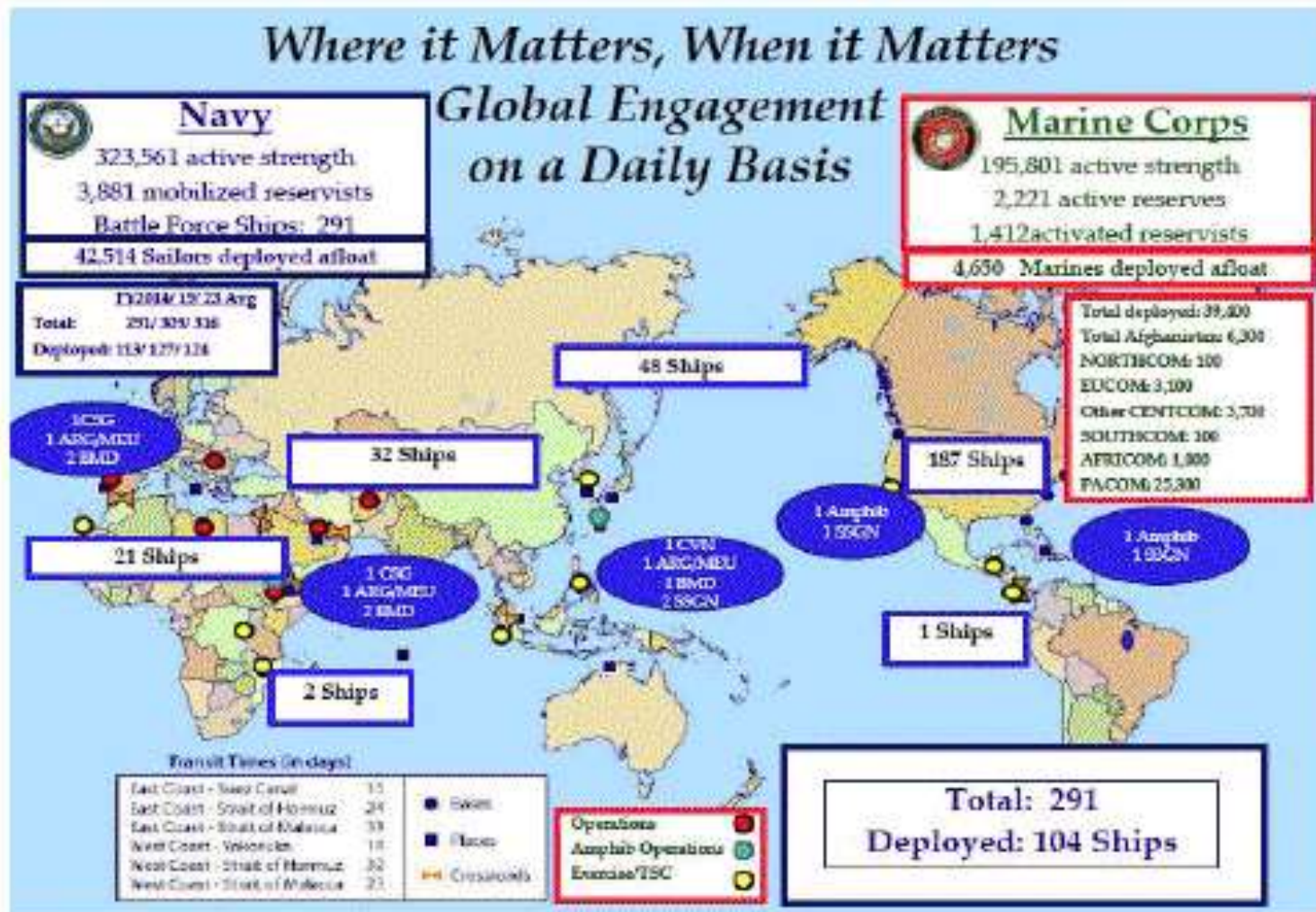
# US Role in Gulf

- US strategic guidance, budget submissions through FY2015, and 2014 QDR all give Middle East same priority as Asia.
- Key is not US forces in the Gulf, but pool of global power projection assets.
- US increasing missile defense ships, SOF, mine warfare, patrol boat forces to deal with Asymmetric threats in the Gulf.
- Forward presence and US Bases in Kuwait, Bahrain, Qatar, UAE, and preposition in Oman – plus GCC base over capacity greatly aid US power projection.
- US advantage in space systems, other IS&R assets, UAVs/UCAVs/cruise missiles, precision strike, electronic warfare, cyberwarfare.
- F-35, new ships and weapons will greatly improve US capability.
- “Extended deterrence?”

# US Army Global Pool of Land Forces



# US Global Pool of Naval and Marine Forces







# US Global Pool of Air Forces

Total Aircraft				Aircraft by Function			
A10	243	HC130J	9	Fighter Aircraft		Aerial Refueling Aircraft	
AC130	34	HC130N	6	A10	243	KC135	352
B1	53	HC130P	14	F15C	174	KC46	0
B2	16	HH60	79	F15D	32	KC10	54
B52	63	KC10	54	F15E	192	Total:	406
C12	27	KC135	352	F16C	662	Strategic Airlift Aircraft	
C130H	227	KC46	0	F16D	60	C5	54
C130J	95	LC130	10	F22	166	C17	188
C17	188	MC12	37	F35	17	Total:	242
C20	11	MC130	39	Total:	1546	Tactical Airlift Aircraft	
C21	17	MD1	131			C130H	227
C32	6	MDQ1	129	Heavy Bomber Squadrons:		C130J	95
C37	10	MQ9	186	B52	63	HC130J	9
C38	2	RC135	17	B1	53	HC130N	6
C40	11	RQ4	31	B2	16	HC130P	14
C5	54	U2	24	Total:	132	LC130	10
CV22	41	UH1	42			Total:	361
E3	27	C25	2			ISR Aircraft	
E4	3	WC130H	19			MQ1	129
E8	13	Total:	3640			MQ9	186
E9	2					RC135	17
EC130	13					RQ4	31
F15C	174					U2	24
F15D	32					Total:	387
F15E	192					Command and Control Aircraft	
F16C	662					E3	27
F16D	60					E4	3
F22	166					E8	13
F35	17					Total:	43

***Syria, Iraq, Yemen, Egypt,  
Lebanon, Jordan AQAP, ISIS All  
Present Common Issues***

***But, Iran is the Key Challenge***

# Assessing the Full Range of Competition

## Non-Military Competition

- *Ideology, religion, and political systems*
- *"Terrorism" and violent extremism vs. "counterterrorism"*
- *Energy, sanctions, and global economic impacts*
- *Arms control, arms exports, and arms imports*
- *International diplomacy*

## Military Competition

- *Weapons of mass destruction*
- *Conventional forces*
- *Asymmetric and irregular warfare*
- *Proxy use of state and non-state actors*
- *Threat and intimidation*

## Nations and Sub-Regions of Competition

- *Gulf Cooperation Council countries*
- *Yemen*
- *Iraq*
- *Jordan*
- *Syria-Lebanon*
- *Israel*
- *Gaza and West Bank*
- *Morocco*
- *Pakistan*
- *Turkey*
- *Afghanistan*
- *Central Asia*
- *Europe*
- *Russia*
- *China*
- *Japan and East Asia*
- *Venezuela, Cuba, Ecuador, and Bolivia*
- *Brazil and Argentina*
- *Sudan*
- *Nigeria*
- *Smaller Sub-Saharan African states*



## **The Broader Patterns in Iranian Activity**

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

## **Rhetoric vs. Reality**

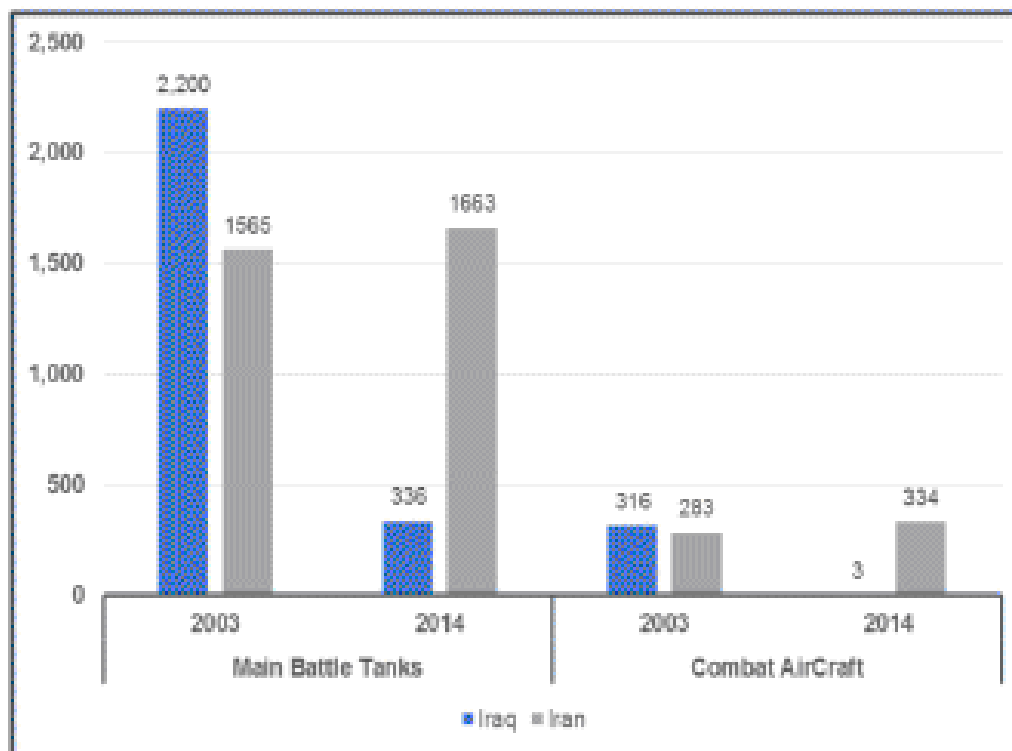
- **Reinforcement of supreme Leader and political rhetoric vs. often solid military assessments and study of western and outside positions.**
- **Statements can defeat all attacks versus focus on defense in depth**
- **Capability to “close the Gulf” vs. steadily upgrading asymmetric capabilities and real world limits.**
- **Nuclear denial vs. nuclear efforts; exaggeration of missile capabilities.**
- **Claims of modernization versus real world limits and failures.**
- **Real but exaggerated progress in Asymmetric warfare.**
- **Exaggerated claims to military production and technology versus limited reality**
- **Claimed focus on US and Israel versus focus on Israel and GCC**
- **Denial/Understatement of links to non-state actors: Hamas, Hizbollah, Iraqi militias, Afghan Northern Alliance**

## **Key Positives for Iran**

- **Invasion of Iraq and aftermath.**
- **Syrian civil war Uncertain & slipping nuclear “redline,” faltering effort in Afghanistan, loss of allied confidence, Egypt.**
- **Success in Lebanon, growing Syrian dependence, ties to Iraqi Shi’ites, presence in Western Afghanistan and role with Hazaras.**
- **Lack of progress and coherence in GCC forces.**
- **Instability of Yemen and Shi’ite populations in Bahrain, Saudi Arabia, other GCC states, Yemen.**
- **Asymmetric warfare progress, reposturing, Al Quds, cyber, etc.**
- **Missile and nuclear progress.**
- **Real progress in modernization, adaptation, selective imports.**
- **Integration of regular and revolutionary forces.**
- **Restructuring of Basij, internal security forces.**

# Iran vs. Iraq: Losing Both a Threat and a Shield

*Iran and Iraq Military Balance in 2003 & 2014*



	Main Battle Tanks		Combat Aircraft	
	2003	2014	2003	2014
<b>Iraq</b>	2,200	336	316	3
<b>Iran</b>	1,565	1,663	283	334

# US Destruction of Iraq's Major Forces

Category	2003			2014		
	Iraq	Iran	Force Ratio	Iraq	Iran	Force Ratio
Active Manpower	424000	513000	4:5	271400	523000	1:2
Reserve Manpower	650000	350000	19:10	0	350000	NA
Main Battle Tanks	2200	1565	7:5	336	1663	1:5
AIFVs	1300	815	8:5	188	610	1:3
APCs	2400	590	4:1	3688	640	6:1
Towed Artillery	1900	2085	9:10	138	2030	1:20
Self-Propelled Artillery	150	310	1:2	48	292	1:6
Multiple Rocket Launchers	200	889	1:5	some	1476	NA
Combat Aircraft	316	283	11:10	3	334	1:100
Attack Helicopters	100	85	6:5	0	50	NA
Major SAM Launchers	225	205	11:10		529	NA

Source: Adapted by Anthony H. Cordesman and Garrett Berntsen from IISS, *Military Balance*, 2014 and IHS Jane's Sentinel series

## The “Shi’ite Crescent”



## **Key Negatives for Iran**

- **A spoiler role is not strategic success: Unstable Lebanon, Iraq, Afghanistan, Uncertain Hamas.**
- **US-led progress, C4I/ISAR, and training progress in GCC forces; Broad Arab treatment of Iran as threat.**
- **Rising Sunni versus Shi'ite tensions; limits to Shi'ite acceptance of Supreme Leader, any form of Iranian control or proxy role.**
- **High level of effectiveness in limits to arms, technology, and production imports.**
- **Lack of Power projection assets, maneuver capability, sustained air capability, and geography of Gulf**
- **Sanctions/delays in nuclear program, impact on military spending, stability.**
- **Lack of nuclear and other WMD weapons, long-rang precision strike capability. Israeli, Pakistani, US nuclear/missile forces in being; US conventional long-range strike capability.**
- **Instability of Yemen and Shi'ite populations in Bahrain, Saudi Arabia, other GCC states, Yemen.**
- **Limits to asymmetric warfare progress, reposturing, Al Quds, cyber, etc.**



# Bahrain's Vulnerability



## Ethnic groups:

Bahraini 46%, non-Bahraini 54% (2010 census)

## Languages:

Arabic (official), English, Farsi, Urdu

## Religions:

Muslim (Shia and Sunni) 81.2%, Christian 9%, other 9.8% (2001 census)

## Population:

1,281,332 July 2013 est.

country comparison to the world: [157](#) note: includes 235,108 non-nationals

## Age structure

0-14 years: 20% (male 130,097/female 126,067)

15-24 years: 15.9% (male 113,973/female 89,602)

25-54 years: 56.2% (male 472,537/female 247,873)

55-64 years: 5.2% (male 43,884/female 23,352)

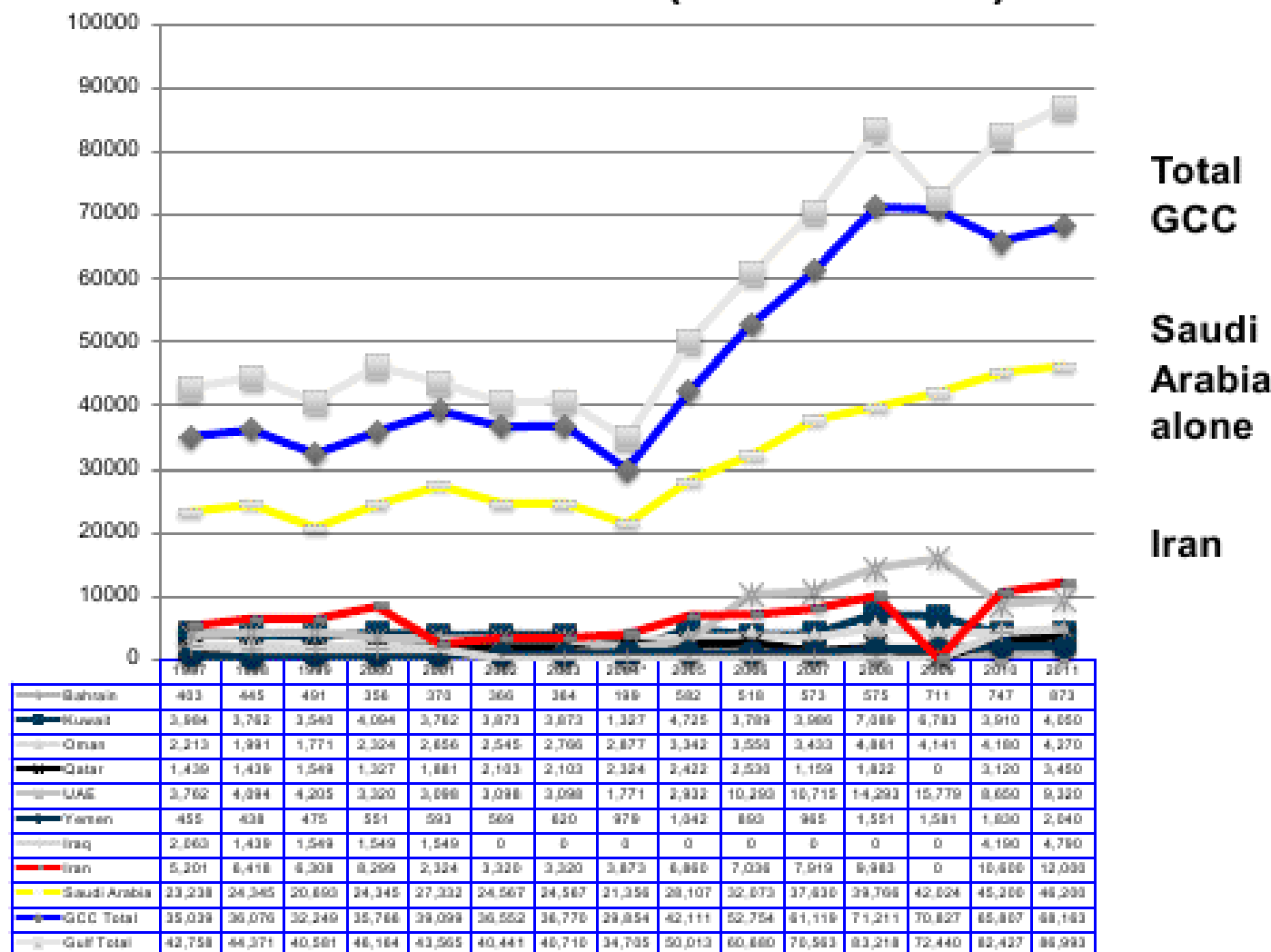
65 years and over: 2.6% (male 16,262/female 17,685) (2013 est.)

## **Key Potential Pivots**

- **Iran deploys functional nuclear forces.**
- **US or Israeli preventive strikes.**
- **Missiles with terminal guidance, extreme accuracy. (w/ or w/o ,missile defenses.**
- **Serious (Shi'ite) unrest in Saudi Arabia and Bahrain.**
- **US tensions with GCC states (and Egypt/Jordan). Excessive US force cuts, spending crisis**
- **Iran access to most modern Russian and Chinese arms: advanced fighters, S-300/S-400 etc.**
- **Major clash in Gulf**
- **Assad victory or defeat in civil war; clear polarization of Iraq.**
- **Serious Iranian political upheavals, power struggle.**
- **Hostile Iranian involvement in post-2015**
- **Real Iran-Iraq-Syria-Hezbollah axis.**
- **New Arab-Israel Conflict.**

***Overwhelming GCC Lead in  
Military Spending and Arms  
Imports***

# The Opportunity: Vast GCC Lead in Military Spending: IISS Estimate: 1997-2011 (\$US Current)



Adapted from annual editions of the IISS *Military Balance*.

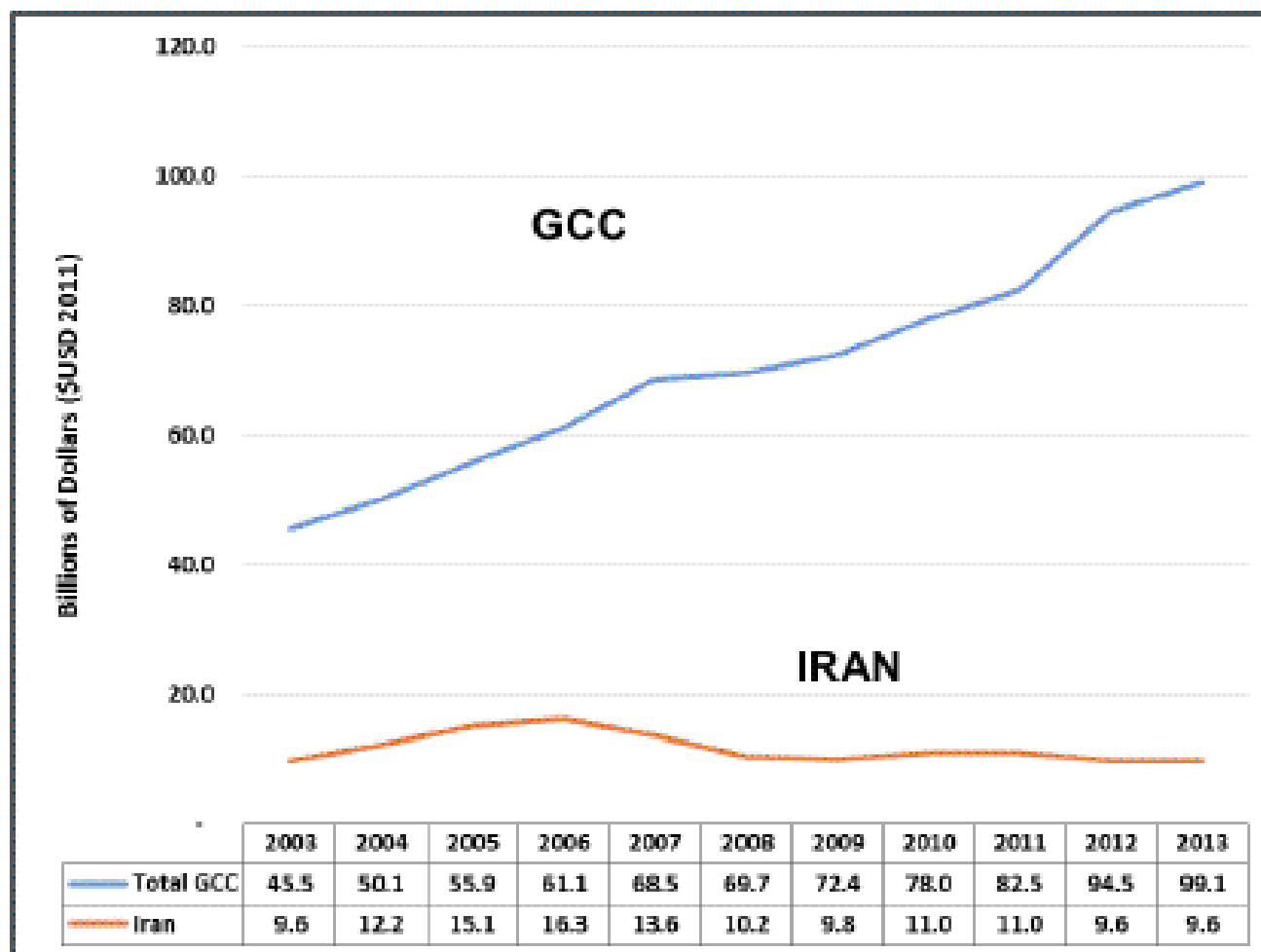
## IISS Estimates: 2003-2013

(In \$US Current Millions)

Year	2009	2010	2011	2012	2013	2014
<b>GCC</b>						
Bahrain	705	747	943	1,020	1,390	-
Kuwait	4,180	4,650	4,070	4,620	4,070	-
Oman	4,020	4,180	4,290	6,720	9,250	-
Qatar	2,500	3,120	3,460	3,730	3,980	-
Saudi Arabia	41,300	45,200	48,500	56,700	59,600	-
UAE	7,880	8,650	9,320	9,320	10,100	-
<b>Total</b>	<b>60,585</b>	<b>66,547</b>	<b>70,583</b>	<b>82,110</b>	<b>88,390</b>	-
<b>Saudi as % of Total GCC</b>	<b>68%</b>	<b>68%</b>	<b>69%</b>	<b>68%</b>	<b>67%</b>	-
<b>Other</b>						
Iran	8,640	10,600	26,400	25,200	17,700	-
Iraq	4,900	4,190	12,000	14,700	16,900	-
Yemen	2,020	1,830	1,340	1,630	1,810	-
Jordan	2,330	1,360	1,370	1,220	1,450	-
<b>Iran as % of Total GCC</b>	<b>14%</b>	<b>16%</b>	<b>37%</b>	<b>31%</b>	<b>20%</b>	-

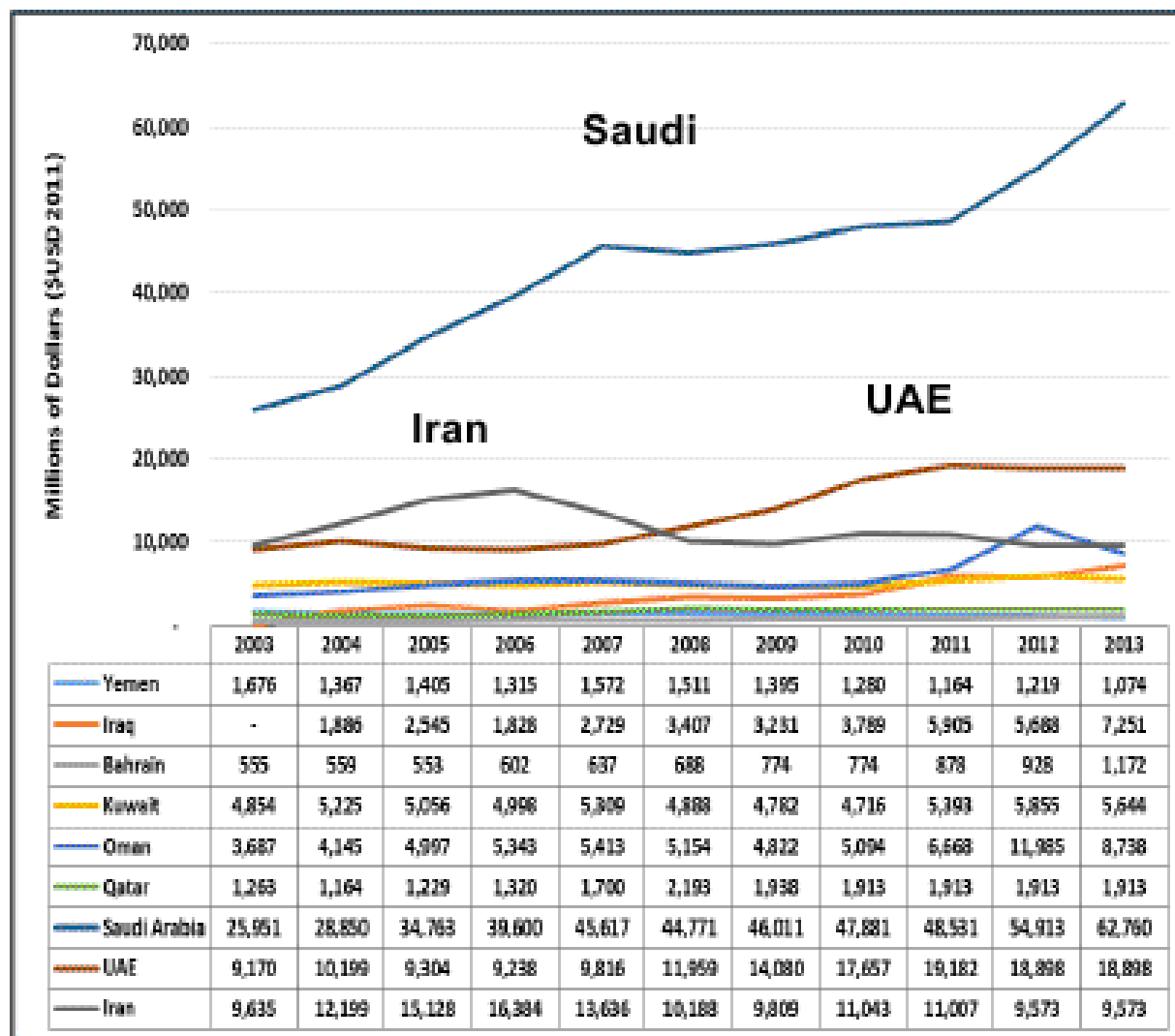
Source: Adapted from various editions of the IISS *Military Balance*.

## SIPRI Trend In Total GCC vs. Iran by Year: 2003-2013



Source: Adapted from SIPRI data as of 8.4.14

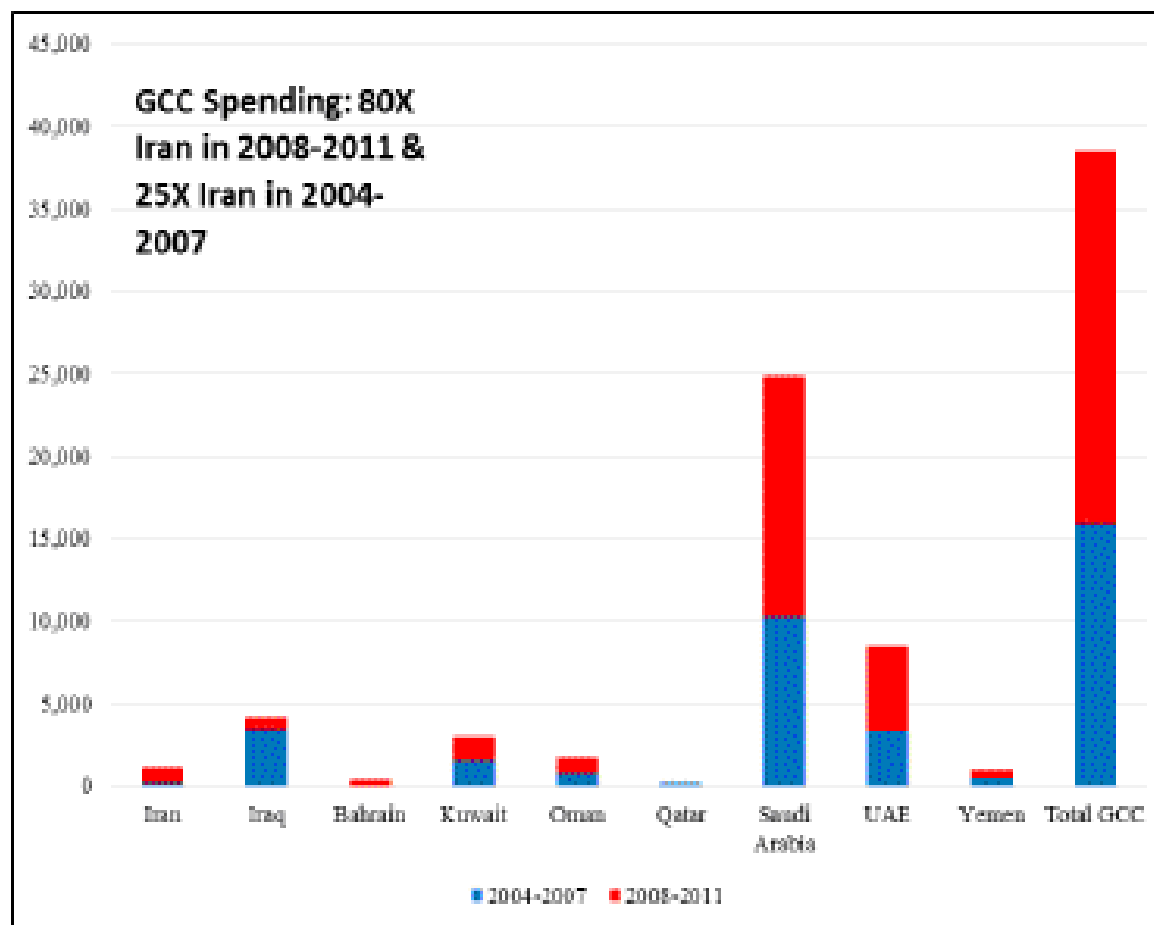
# SIPRI: Trend In Gulf Spending by Country by Year: 2003-2013



Source: Adapted from SIPRI data as of 8.4.14

# US Arms Delivery Estimates: 2003-2023

(In \$US Current Billions)



Source: Richard F. Grimmett and Paul K. Kerr, *Conventional Arms Transfers to Developing Nations, 2004-2011*, Congressional Research Service, August 24, 2012. P. 44-45.



# US Arms Delivery Estimates: 2003-2023

(In \$US Current Billions)

Recipient Country	U.S.	Russia	China	Major West European	All Other European	All Others	Total
2004-2007							
Bahrain	200	0	0	100	0	0	300
Iran	0	500	200	0	0	200	900
Iraq	200	100	0	100	300	100	800
Kuwait	1,500	0	0	0	0	0	1,500
Oman	700	0	0	300	0	0	1,000
Qatar	0	0	0	0	0	0	0
Saudi Arabia	4,300	0	200	9,900	100	100	14,600
UAE	600	200	0	4,000	400	0	5,200
Yemen	0	400	0	0	100	100	600
GCC Total	7,300	200	200	14,300	500	100	22,600

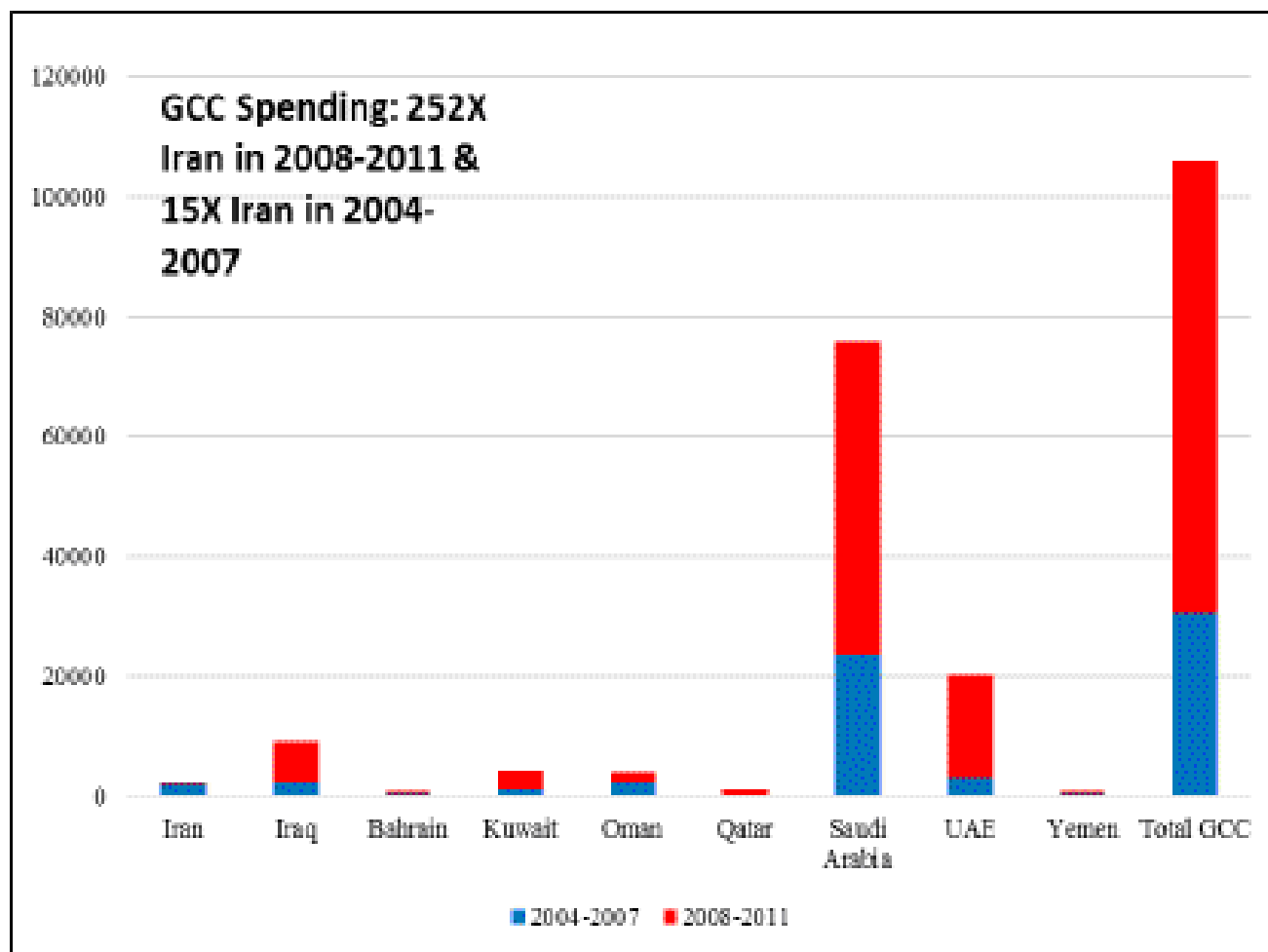
Recipient Country	U.S.	Russia	China	Major West European	All Other European	All Others	Total
2008-2011							
Bahrain	0	0	0	0	0	0	0
Iran	0	200	0	0	0	0	200
Iraq	2,600	300	0	300	100	100	3,400
Kuwait	1,300	100	100	0	0	0	1,500
Oman	200	0	0	500	0	0	700
Qatar	0	0	0	200	0	0	200
Saudi Arabia	5,900	0	700	3,300	300	0	10,200
UAE	2,000	300	100	600	300	0	3,300
Yemen	0	100	0	0	200	100	400
GCC Total	9,400	400	900	4,600	600	0	15,900

Notes: 0= data less than \$50 million or nil. All data are rounded to the nearest \$100 million.  
a. Major West European category includes France, United Kingdom, Germany, and Italy totals as an aggregate figure.

Source: Richard F. Grimmett and Paul K. Kerr, Conventional Arms Transfers to Developing Nations, 2004-2011, Congressional Research Service, August 24, 2012. P. 44-45.

## US New Arms Transfer Estimates: 2003-2023

(In \$US Current Billions)



Source: Richard F. Grimmett and Paul K. Kerr, *Conventional Arms Transfers to Developing Nations, 2004-2011*, Congressional Research Service, August 24, 2012. P. 44-45.

## US New Arms Transfer Estimates: 2003-2023

Recipient Country	U.S.	Russia	China	Major West European	All Other European	All Others	Total
<b>2004-2007</b>							
Bahrain	400	0	0	100	0	0	500
Iran	0	1,600	300	0	100	100	2,100
Iraq	1,100	100	100	200	600	200	2,300
Kuwait	1,000	0	0	0	0	0	1,000
Oman	100	0	0	2,100	0	0	2,200
Qatar	0	0	0	0	0	100	100
Saudi Arabia	5,000	0	800	16,900	800	100	23,600
UAE	1,400	300	100	1,100	200	0	3,100
Yemen	0	200	0	0	100	100	400

Recipient Country	U.S.	Russia	China	Major West European	All Other European	All Others	Total
<b>2008-2011</b>							
Bahrain	400	0	0	0	0	0	400
Iran	0	100	0	0	100	100	300
Iraq	4,800	300	0	500	900	200	6,700
Kuwait	2,500	700	0	0	0	0	3,200
Oman	1,500	0	0	200	0	0	1,700
Qatar	200	0	0	800	0	0	1,000
Saudi Arabia	45,600	0	0	5,300	1,100	100	52,100
UAE	14,300	100	0	1,600	1,100	100	17,200
Yemen	0	100	0	0	300	100	500

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

a. Major West European category includes France, United Kingdom, Germany, and Italy totals as an aggregate figure.

Source: Richard F. Grimmett and Paul K. Kerr, Conventional Arms Transfers to Developing Nations, 2004-2011,

Congressional Research Service, August 24, 2012, P. 44-45

# ***The Conventional Balance in the Gulf***

## Iran's Strategic Depth



***GCC Lead in Key Land Force  
Weapons Even Without US,  
British, and French Power  
Projection***

## Land Threats

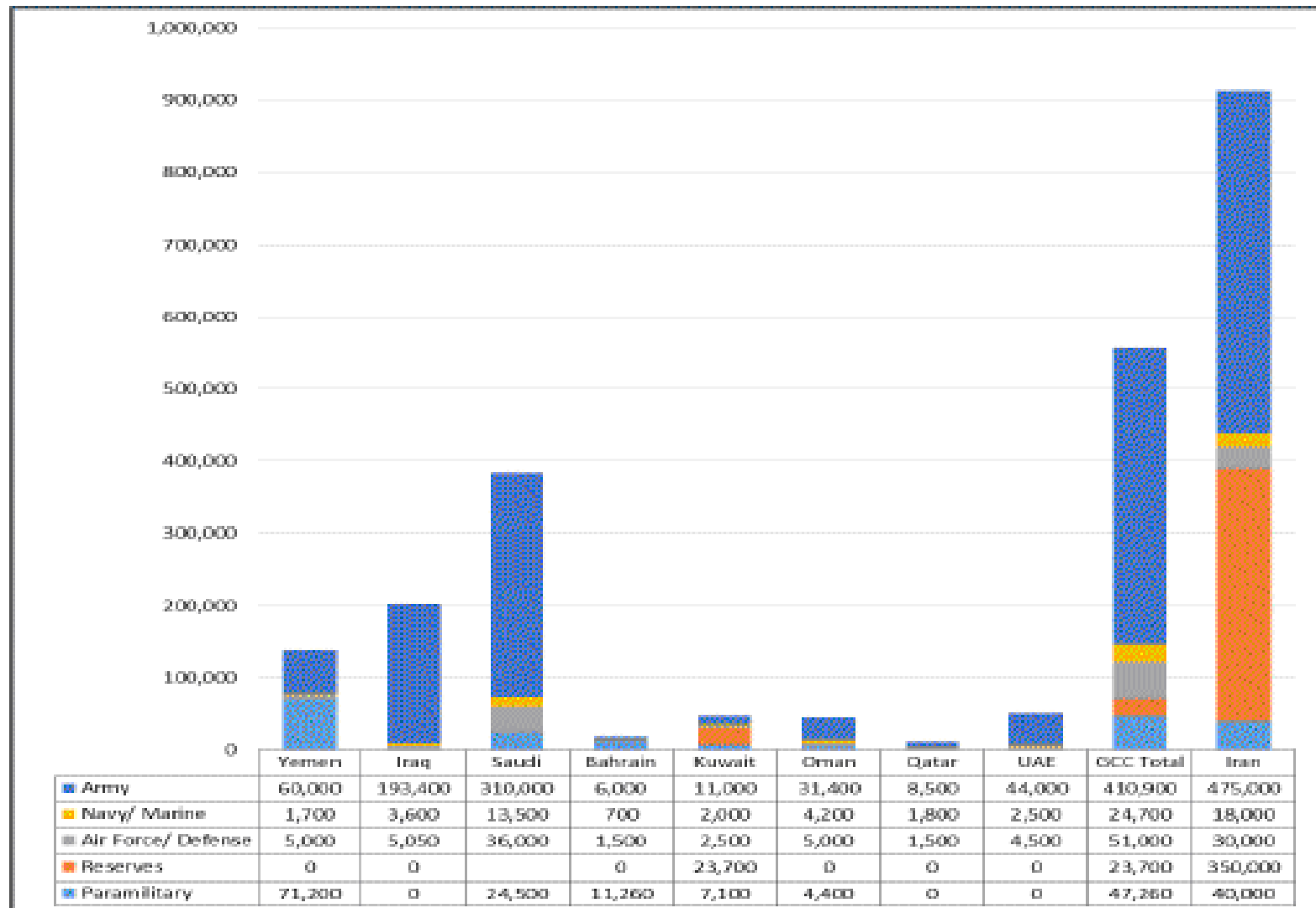
- Iran superior in mass, but not weapons quality. Reliance on aging and worn armor, towed artillery.
- Limited Iranian ability to project and sustain armored forces.
- ***No effective air cover, survivable naval escort and defense.***
- Not practice large-scale forced entry with amphibious forces, but significant capability for small raids and can quickly ferry substantial forces if invited in.
- Key GCC area of vulnerability is through Iraq to Kuwait: “Kuwaiti hinge. (Much depends on level of Iraqi ties to Iran.)
- Iranian IRGC, marines, special forces have significant raid capability in Gulf and near coastal areas. Raids on offshore and critical shore facilities.
- Covert operations, sabotage.
- Attacks on US-allied military facilities

## The “Kuwaiti Hinge”





# Total Combat Manpower without US and Other Allied Forces



Source: Adapted by Anthony H. Cordesman and Garrett Bertsen from IISS, *Military Balance*, 2014 and IHS Jane's Sentinel series. Saudi Force totals were provided by Nawaf Obaid. Projected Saudi Force growth goals are 300,000 in the Army, 200,000 in the National Guard, and 40,000 in the Navy by 2020. The Saudi National Guard (125,000) is included in the Saudi Army Total and the Saudi Industrial Security Force (9,000) is included in the Paramilitary category.

## Iranian Reliance on Aging/ Mediocre Systems – Land

**MBT** 1,663+: 150 M60A1;

100 *Chieftain* Mk3/Mk5; 540 T-54/T-55/Type-59/Safir-74; 168

M47/M48 **(480 T-72Z? 75+ T-62? 150 Zulqifar?)**

**LT TK** 80+: 80 *Scorpion*;

**RECCE** 35 EE-9 *Cascavel*

**AIFV** 610: 210 BMP-1; 400 BMP-2 with 9K111

**APC (T)** 340+: 200 M113; BMT-2 *Cobra*

**APC (W)** 300+: 300 BTR-50/BTR-60; *Rakhsh*

**SP** 292+: **155mm** 150+: 150 M109;; **175mm**

22 M107; **203mm** 30 M110

**TOWED** 2,030+; **105mm** 150: 130 M101A1;; **155mm** 205: 120

GHN-45; 70 M114; 15 Type-88 WAC-21; **203mm** 20 M115

**AIRCRAFT** • 10 Cessna 185; 2 F-27 *Friendship*; 4 Turbo

*Commander* 690 **PAX** 1 *Falcon* 20

**ATK** 50 AH-1J *Cobra*

**TPT** 173: **Heavy** 20 CH-47C *Chinook*; **Medium** 25 Mi-171;

**Light** 128: 68 Bell 205A (AB-205A); 10 Bell 206 *Jet Ranger*  
(AB-206); 50 Bell 214

**MANPAD** 9K36 *Strela-3* (SA-14 *Gremlin*); 9K32 *Strela-2* (SA-7  
*Grail*)‡; **SP** 180: **23mm** 100 ZSU-23-4; **57mm** 80 ZSU-57-2

**New**

**Tanks?**

**OAVs?**

**Attack**

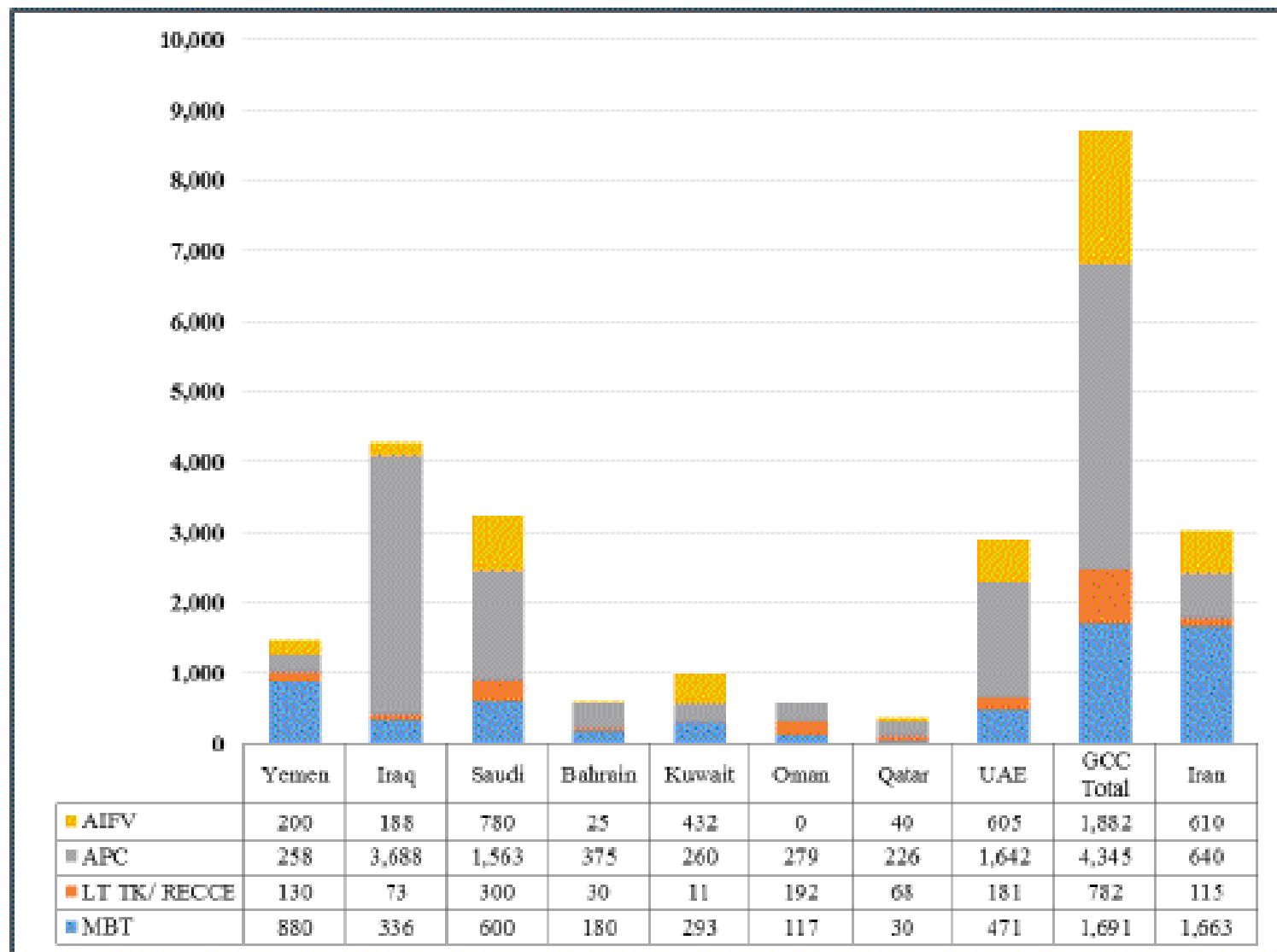
**Copters?**

**SP Arty**

**SHORADS**

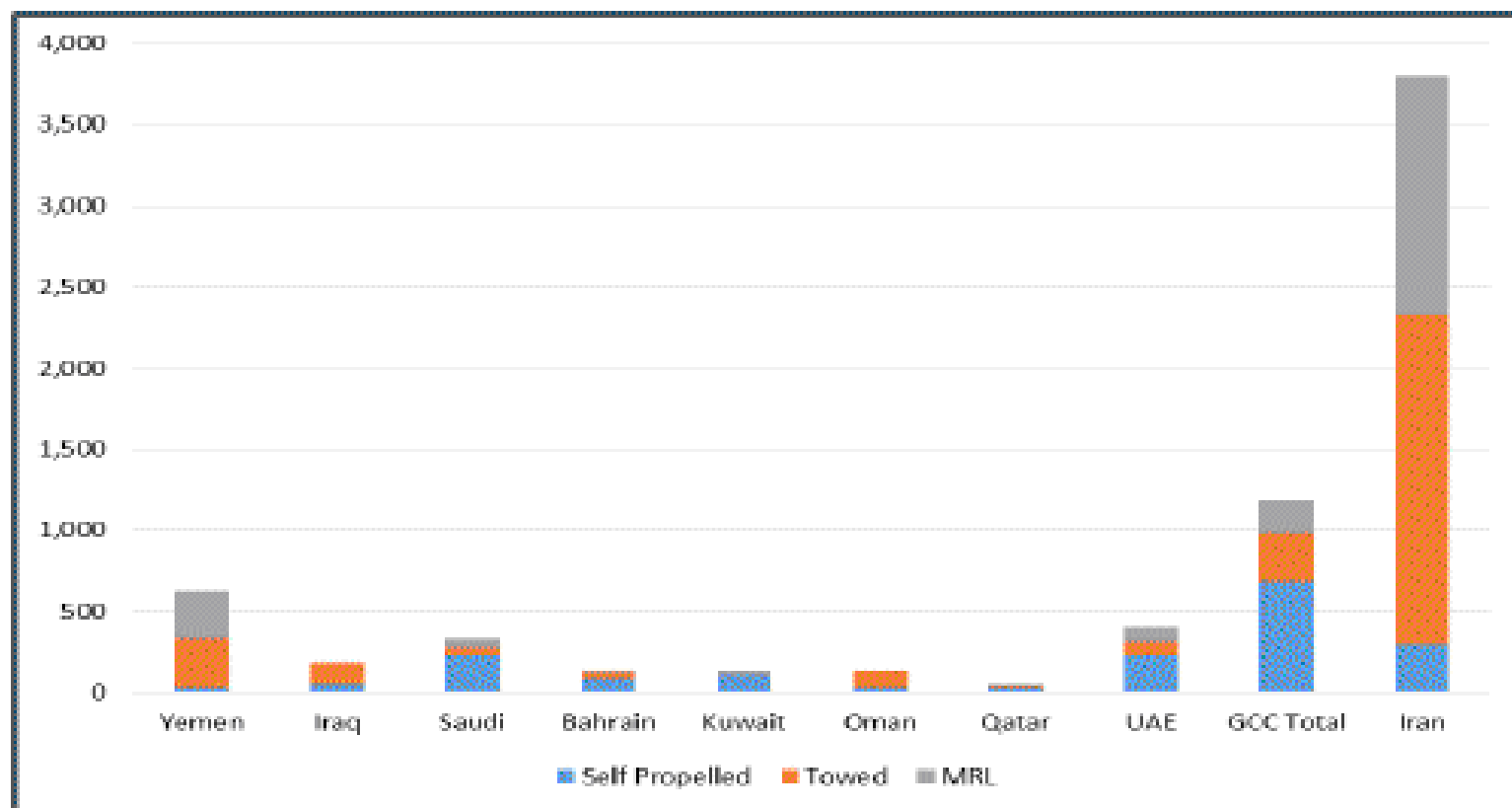
**?**

# Total Major Armored Weapons without US and Other Allied Forces



Source: Adapted by Anthony H. Cordesman and Garrett Berntsen from IISS, *Military Balance*, 2014 and IHS Jane's Sentinel series

## Total Major Artillery Weapons without US and Other Allied Forces



	Yemen	Iraq	Saudi	Bahrain	Kuwait	Oman	Qatar	UAE	GCC Total	Iran
Self Propelled	25	48	224	82	106	24	28	221	685	292
Towed	310	138	50	36	0	108	12	93	299	2,030
MRL	294	some	60	9	27	0	4	92	192	1,476
Mortars	642	1,200	437	24	78	101	45	155	840	5,000

Source: Adapted by Anthony H. Cordesman and Garrett Berntsen from IISS, *Military Balance*, 2014 and IHS Jane's Sentinel series

***GCC Lead in Airpower, SAMs,  
and Missile Defense Even  
Without US, British, and  
French Power Projection***

## 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.*

# Range of Iran's Air Power



## **What Iran lacks in Air Power:**

The following are some general criteria that would be required for Iran to try and maintain a technological and qualitative edge over the GCC Airforces:

### **• Aircraft:**

- Multi-mission capability.
- High Operational Readiness/Full Mission Capable state and high sortie rates.
- All weather day / night operational capability
- Quick response / ground launched interceptors against incoming intruders.
- High Endurance.
- Airborne Electronic Warfare (ESM/ECM/ECCM) survivability
- Detect track and engage multiple mobile ground targets as well as Hard and Deeply Buried Targets (HDBTs).
- Rapidly destroy advanced air defense systems.
- Capable of carrying out deep strike missions.
- Short C4I Early Warning delay time due to having antiquated System, semi-automated man in the loop, giving rise to long Response / Scramble Time by Combat Aircraft

### **• Air to Air Missiles:**

- Aircraft to be capable of multiple target engagement. Fire and Forget/Launch and leave with high single shot kill capability.
- Good target discrimination and enhanced resistance to countermeasures.
- Increase in range of firing missile at the same time shortening the flight time to the target.
- low Loss Exchange Ratio in a Closing / BVR Environment and Visual Engagement Environment.

•



## Iranian Reliance on Aging/Mediocre Systems – Air

**FTR** 184+: 20 F-5B *Freedom Fighter*; 55+ F-5E *Tiger II*/F-5F *Tiger II*; 24 F-7M *Airguard*; 43 F-14 *Tomcat*; **36 MiG-29A/U/UB *Fulcrum***; up to 6 *Azarakhsh* reported

**FGA** 111: 65 F-4D/E *Phantom II*; 10 *Mirage F-1E*; 30 Su-24MK *Fencer D*; up to 6 *Saegheh* reported

**ATK** 13: 7 Su-25K *Frogfoot*; 3 Su-25T *Frogfoot*; 3 Su-25UBK *Frogfoot*

**ASW** **5 P-3MP *Orion***

**ISR**: 6+ RF-4E *Phantom II*\*

**TKR/TPT** B-707; ε2 B-747

**TPT** 117: **Medium** ε19 C-130E/H

*Hercules*; **Light** 10 F-27 *Friendship*; 1 L-1329 *Jetstar*;

10 PC-6B *Turbo Porter*; 8 TB-21 *Trinidad*; 4 TB-200 *Tobago*;

3 *Turbo Commander* 680; 14 Y-7; 9 Y-12; **PAX** 11: 2 B-707; 1

B-747; 4 B-747F; 1 *Falcon* 20; 3 *Falcon* 50

### HELICOPTERS

**MRH** 32: 30 Bell 214C (AB-214C); 2 Bell 412

**TPT** 4+: **Heavy** 2+ CH-47 *Chinook*; **Light** 2+: 2 Bell 206A *Jet Ranger* (AB-206A);

**New  
Fighters?  
ISR?  
Tankers?  
UCAVs?S-  
300/S-400?**

# Iran's Maximum Sortie Generation Rate

(Ignores severe limits to operational availability: 40-60% of force)

## Iran Airforce Tactical Fighter Capabilities - 2014

Type	No	Operational Readiness (%)	Force Available	Total Sortie Per Day	Postulated Employment
MIG-29A	36	60	22	44	Air Defense/Escort/FS/BAS
Su-26	13	60	8	16	CAS/BI/Deep Strike
SU-24	30	60	18	36	CAS/BI/Deep Strike
F-14	43	60	26	52	Air Defense/FS CAS/BI/Deep
F-4E/D	65	60	39	78	Strike/SEAD
<b>Total</b>	<b>187</b>		<b>113</b>	<b>226</b>	

BAS: Battlefield Air Superiority

CAS: Close Air Support

BI: Battlefield Interdiction

DS: Defense Suppression

FS: Fighter Sweep

Sustained Conditions : 12 hr Operational Day

18 hr Maintenance Day

2 Sorties per Aircraft per day

Source: Dr. Abdullah Toukan, April 29, 2014

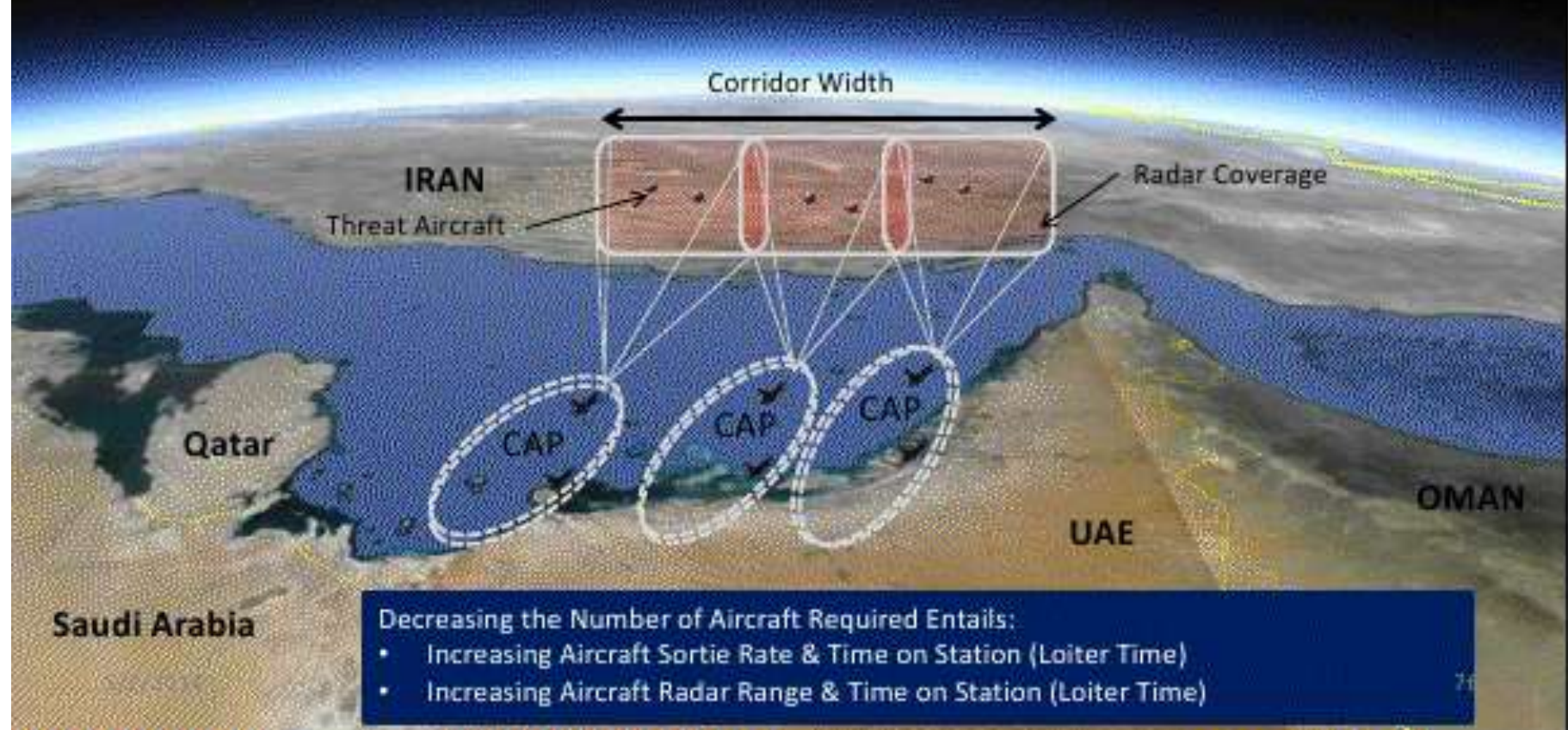
# Range of GCC Air Power





# Typical GCC Combat Air Patrol Mission

Aircraft Required on CAP Stations	x	Number of Aircraft to Support Each CAP Station	=	Total Aircraft Required
(Number of CAP Stations) x 2	x	Operational Day 12 hrs (Sortie Rate) x (Loiter Time)	=	(Aircraft Required on CAP) x (Aircraft Required to Support CAP)
$3 \times 2 = 6$	x	$12 / (3 \times 2) = 2$	=	$6 \times 2 = 12$



# GCC's Maximum Sortie Generation Rate

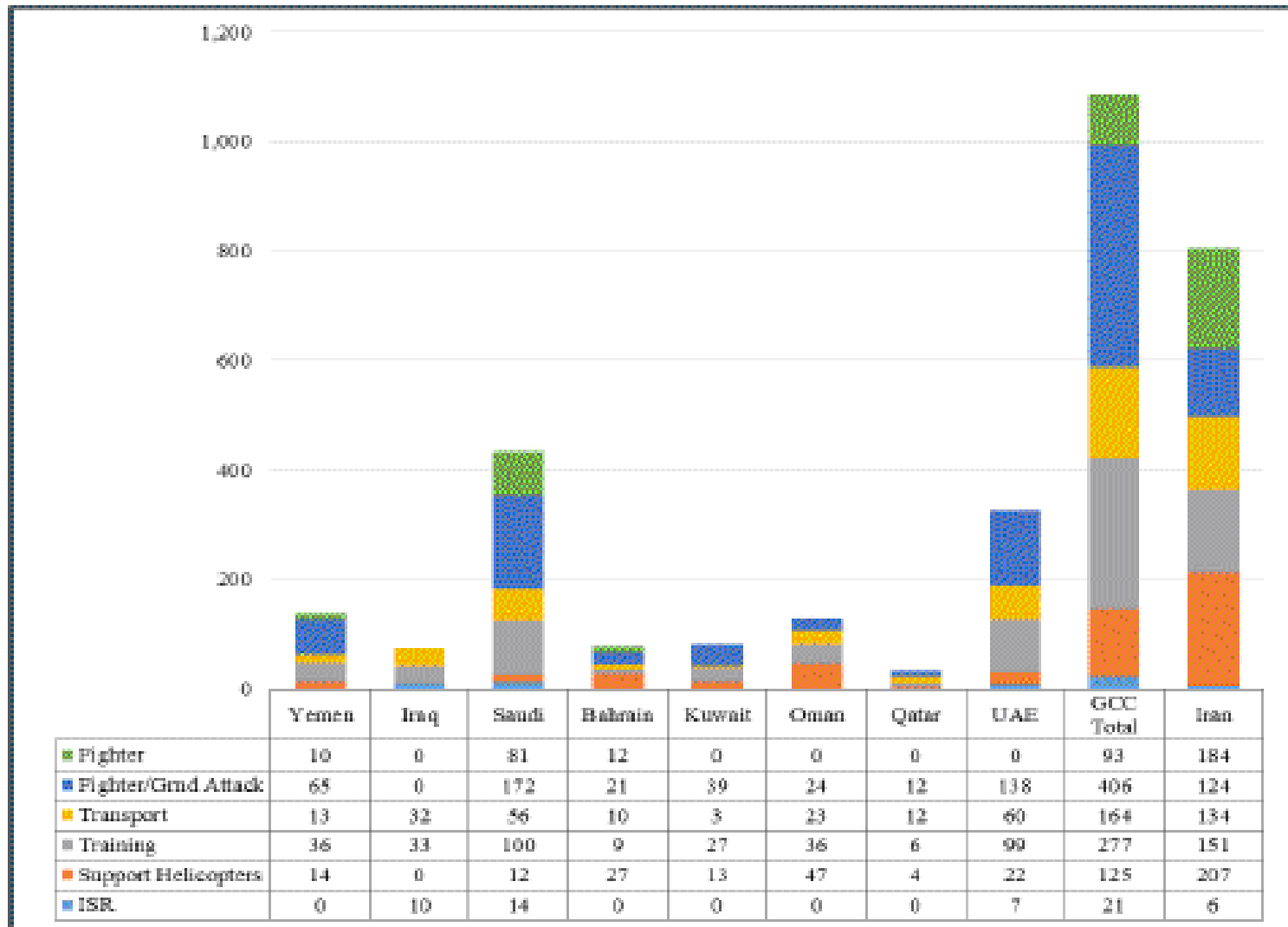
## GCC Airforce Tactical Fighter Capabilities - 2014

Type	Order of Battle	Operational Ready %	Force Available	Force Total Sorties per Day	Postulated Employment
Tornado IDS	Saudi Arabia: 69	75	52	156	Deep Strike
Typhoon-2	Saudi Arabia: 32	75	24	72	FS, BAS, AD, Escort
Mirage 2000	UAE: 60 Qatar: 12 (Total: 72)	75	UAE: 45 Qatar: 9 (Total: 54)	UAE: 135 Qatar: 27 (Total: 162)	FS, BAS, AD, Escort
F-18	Kuwait: 39	75	29	87	FS, BAS, AD, Escort, CAS, BI, SEAD
F-16C/D	Bahrain: 21 Oman: 12 UAE: 78 (Total: 111)	75	Bahrain: 15 Oman: 9 UAE: 68 (Total: 82)	Bahrain: 45 Oman: 27 UAE: 174 (Total: 246)	FS, BAS, AD, Escort, CAS, BI
F-15C/D	Saudi Arabia: 81	75	61	183	FS, BAS, AD, Escort, CAS, BI
F-15S	Saudi Arabia: 71	75	53	159	Deep Strike, FS, AD, Escort, CAS, BI
<b>Total</b>	<b>475</b>		<b>355</b>	<b>1065</b>	

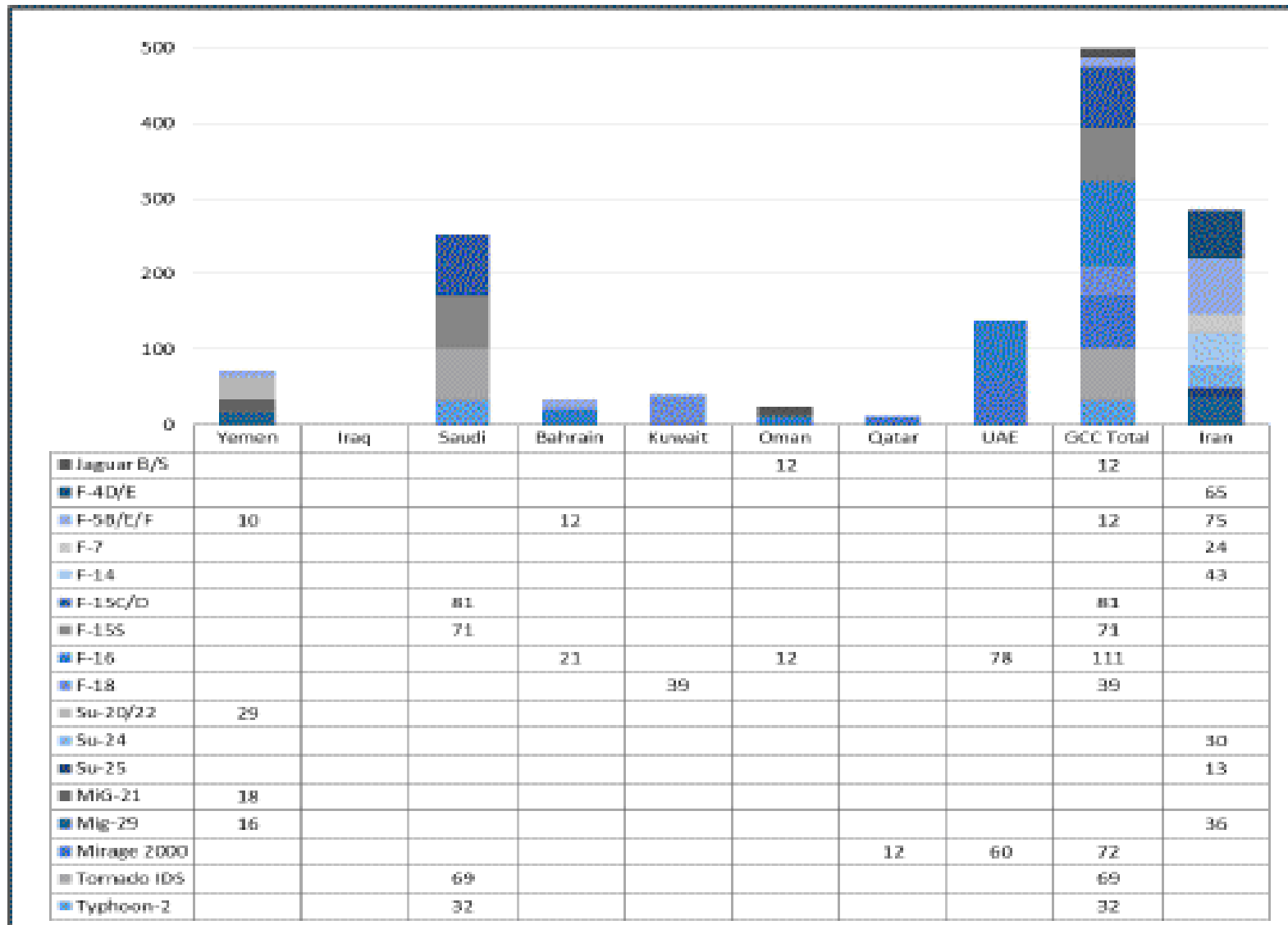
FS: Fighter Sweep, BAS: Battlefield Air Superiority, AD: Air Defense,  
CAS: Close Air Support (Air to Ground Role), BI: Battle Field Interdiction (Air to Ground Role)  
SEAD: Suppression of Enemy Air Defences

Sustained Conditions : 12 hr Operational Day  
38 hr Maintenance Day  
3 Sorties per aircraft per day

# Total Combat Air Strength without US and Other Allied Aircraft

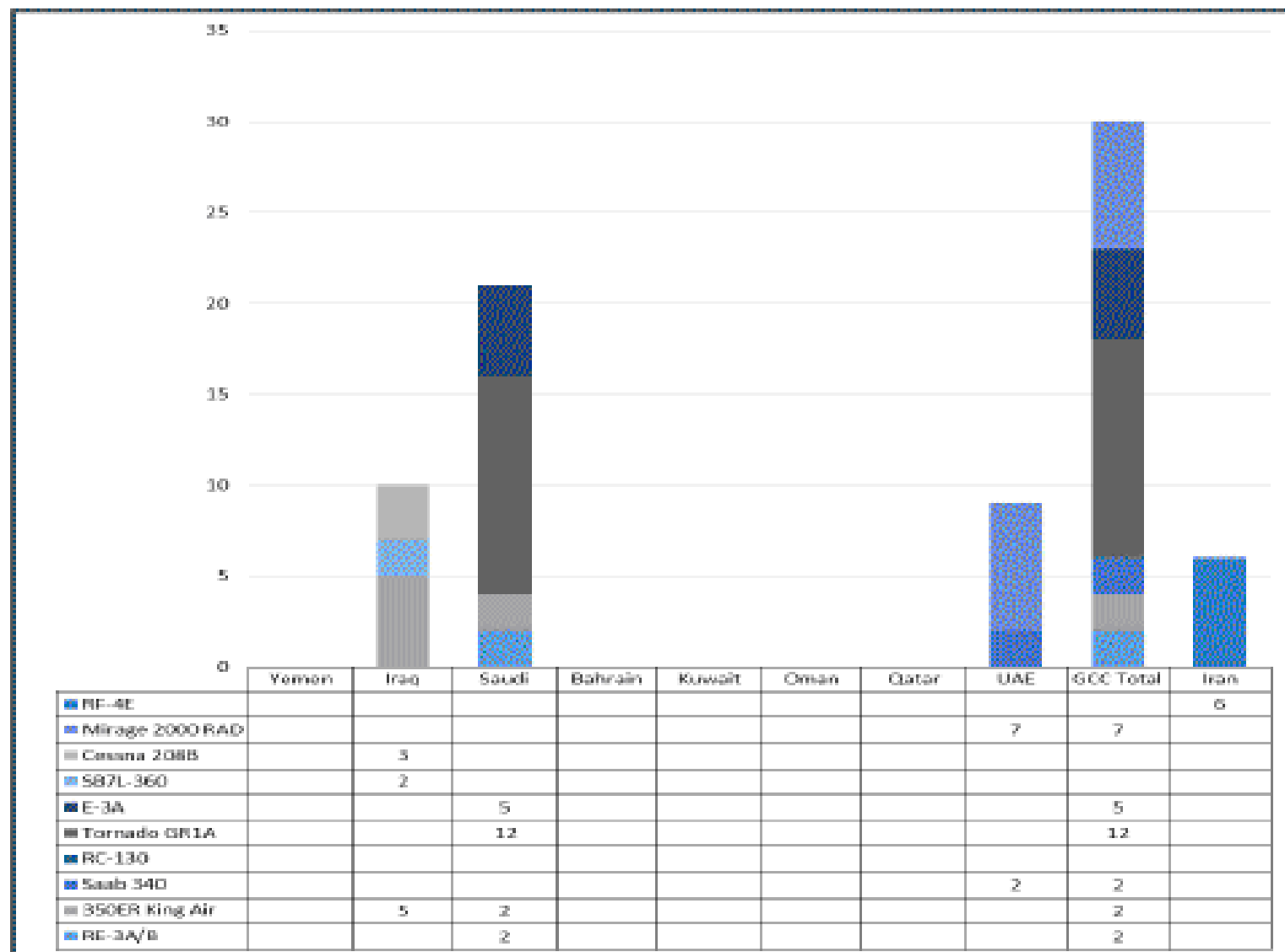


# Comparative “Modern” Fighter Strength without US and Other Allied Aircraft



Source: Adapted by Anthony H. Cordesman and Garrett Berntsen from IISS, *Military Balance*, 2014 and IHS Jane's Sentinel series

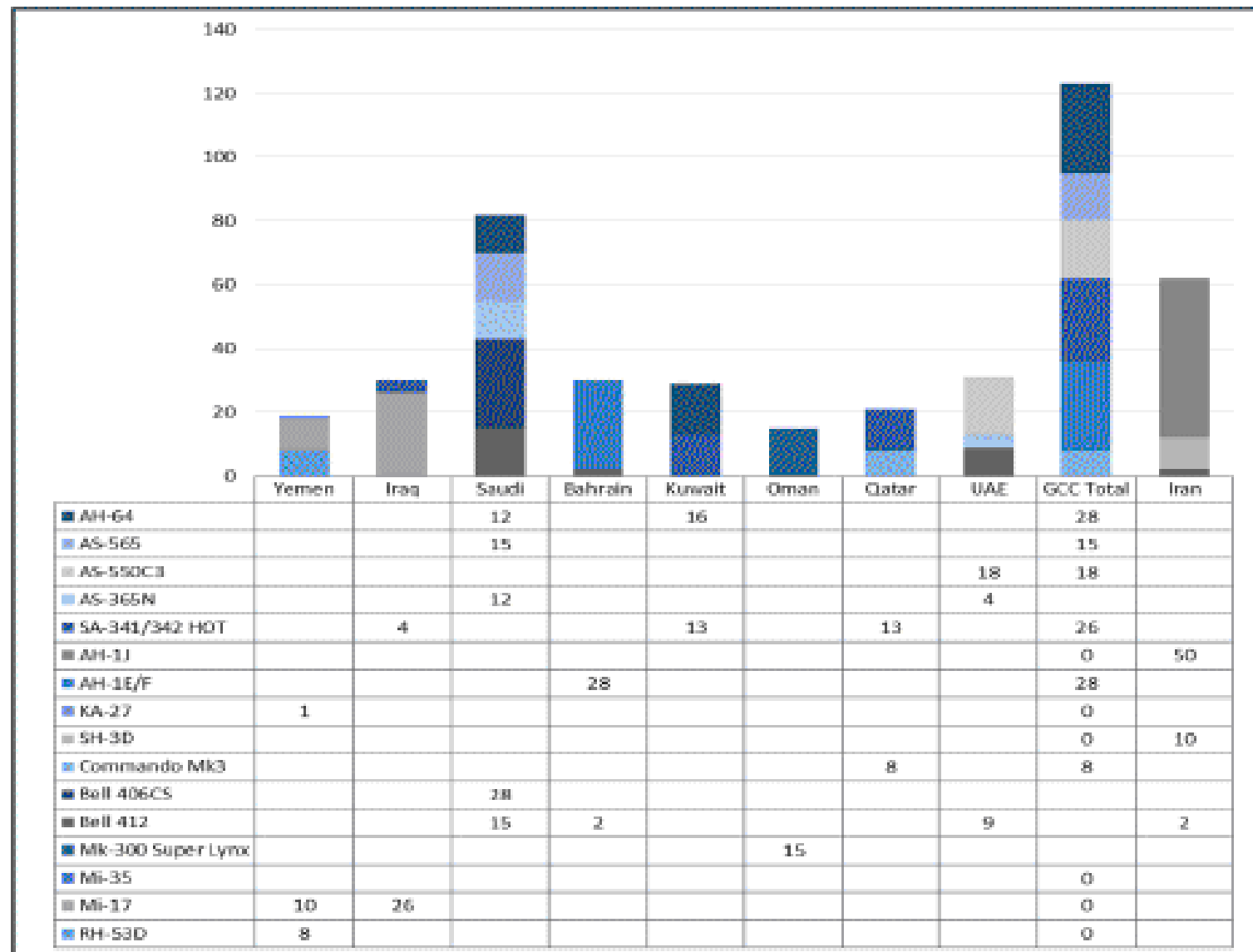
## Comparative Reconnaissance, Major Intelligence, & Air Control and Warning (AEW/ AWACS) Aircraft Strength without US and Other Allied Aircraft



Source: Adapted by Anthony H. Cordesman and Garrett Berntsen from IISS, *Military Balance*, 2014 and IHS Jane's Sentinel series



## Comparative Attack, Armed, and Naval Combat Helicopters Strength without US and Other Allied Aircraft



Source: Adapted by Anthony H. Cordesman and Garrett Berrisen from IISS, *Military Balance*, 2014 and IHS Jane's Sentinel series

## Illustrative Iranian UAV Projects /Assets

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

Iran is developing a range of UCAVs, and has made recent claims to a long-range “stealth” UCAV bomber

Source: Adopted by Adam C. Seitz from ALAA Aerospace 9 Worldwide UAV Roundup; available at: [http://www.aiaa.org/Aerospace/images/articleimages/pdf/UAVs\\_APR2009.pdf](http://www.aiaa.org/Aerospace/images/articleimages/pdf/UAVs_APR2009.pdf).

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

# Iranian Reliance on Aging/Mediocre Systems – Air Defense

## Air Defense Force

### **SAM** 529+:

250 FM-80 (*Crotale*); 30 *Rapier*; 15 *Tigercat*;  
150+ MIM-23B I-HAWK/*Shahin*; 45 S-75 *Dvina* (SA-2  
*Guideline*); 10 S-200 *Angara* (SA-5 *Gammon*); 29 9K331  
*Tor-M1* (SA-15 *Gauntlet*) (reported)  
**MANPAD** FIM-92A *Stinger*; 9K32 *Strela-2* (SA-7 *Grail*)‡

S-  
300/S-  
400?

## Army

**SP** 10+: HQ-7 (reported); 10 *Pantsyr* S-1E (SA-22  
*Greyhound*)

**MANPAD** 9K36 *Strela-3* (SA-14 *Gremlin*); 9K32 *Strela-2*  
(SA-7 *Grail*)‡; *Misag 1* (QW-1 *Vanguard*); *Misag 2* (QW-  
11); *Igla-S* (SA-24 *Grinch* - reported); HN-54

## **Iran's Current Land Based Air Defense Systems**

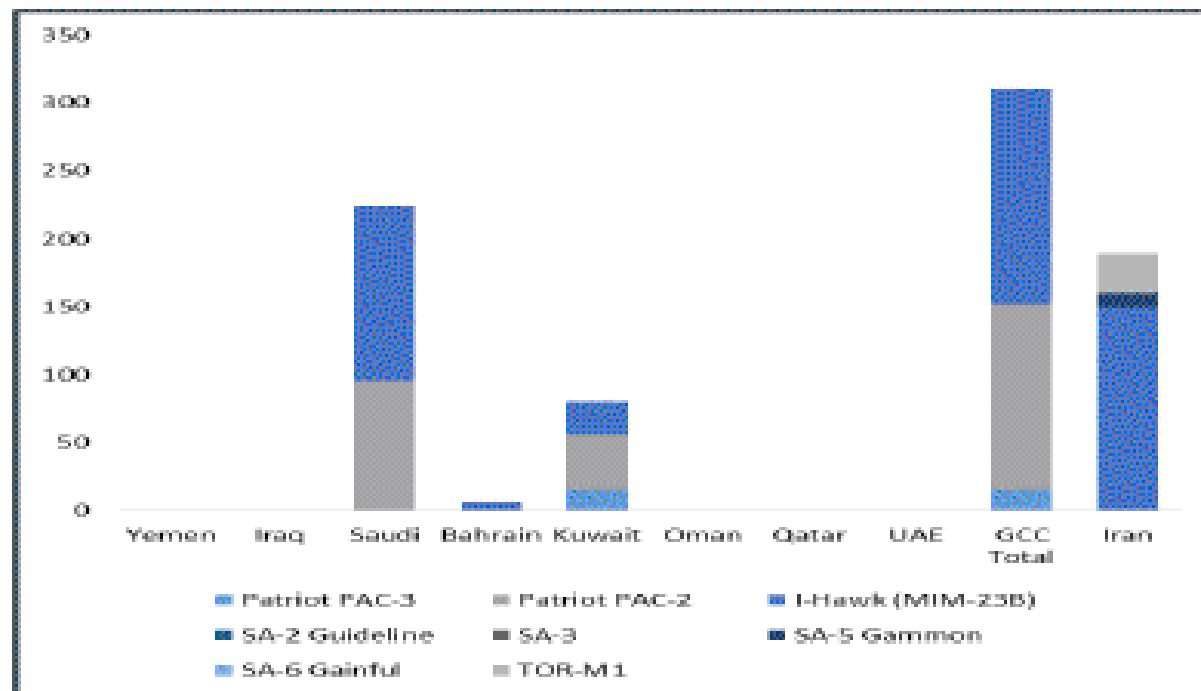
- Iran has extensive surface-to-air missile assets, but most are obsolete or obsolescent. Iran's systems are poorly netted, have significant gaps and problems in their radar and sensor coverage and modernization, and a number of its systems are vulnerable to electronic warfare
- U.S. never delivered integrated system before fall of Shah so Iran never had a fully functioning air defense system.
- Iran has made many statements that it has upgraded and modernized many of the components of such its Air Defense systems using Russian, Chinese, US, European, and Iranian-designed and made equipment. But Iran does not have the design and manufacturing capability to create truly modern system, one that is immune to electronic warfare, and one that can function without become tactically vulnerable to anti-radiation weapons and other forms of active "suppression of enemy air defense" (SEAD) systems.
- Only modern short-range point defense system is TOR-M. Other short-range systems mix of older Russian system, SHORADs (Short Range Air Defense), and aging – possible inactive British and French systems.
- Medium to long-range systems are low capability or obsolescent. Iran has some 150 HAWKS and IHAWKs do not have capable ECM. Date back to 1960s and 1970s. It claims to be able to produce its own IHAWK missiles. Has various versions of SA-2 obsolete.
- Radar sensor and battle management/C4I systems have major limitations.
- Regardless of how much Iran states that it has made progress, it will still be vulnerable to the advanced technology U.S. combat aircraft as well as the electronic warfare and defense suppression weapon systems. This will give the U.S. Strike Force the freedom, if required after the first strike, to conduct a sustained campaign of strikes over a few days.

## Medium to Long Range Surface To Air Missile Systems

Air Defense System	Associated Early Warning/Acquisition Radars	Associated Tracking & Guidance Radars	Missile Ranges (km) Altitude (ft)	In Service Date
SA-2	Spoon Rest D (P-18) Flat Face A (P-15)	Fansong A/B	Max (km): 40 Min (km) : 8 Altitude (ft): 3,000 to 90,000	1971 Upgraded
SA-3	Flat Face B (P-19) Squat Eye	Low Blow	Max (km) : 30 Min (km) : 6 Altitude (ft): 150 to 160,000	1971
SA-6	Long Track (P-40) Height Finder: Thin Skin B (PRV-9)	Straight Flush	Max (km): 24 Min (km) : 4 Altitude (ft): 50 to 45,000	1973
SA-8	Flat Face B (P-19) Long Track (P-40) Height Finder: Thin Skin B (PRV-9)	Land Roll	Max (km) : 15 Min (km) : 0.2 Altitude (ft): 40 to 40,000	1982
SA-5	Back Trap (P-80) Tall King C (P-14) Spoon Rest D (P-18) Height Finder: Odd pair (PRV-13) Odd Group (PRV-16)	Square Pair	Max (km) : 250 Min (km) : 20 Altitude (ft): 1,500 to 130,000	1983
THAWK	AN/MPQ-50 AN/MPQ-55 (PIP II)/62 (PIP III) Range only Radar	AN/MPQ-57 (PIP II)/61 (PIP III)	Max (km): 35 Min (km): 3 Altitude (ft): 0 to 55,000 ft	1971
Patriot PAC-2	AN/MPQ-53 Phased-Array Radar Carries out Search, target detection, track and identification, missile tracking and ECCM functions	AN/MSQ-104 Engagement Control Station (ECS)	Max (km): 70 Min (km): 3 Altitude (ft): 80,000	1990

(Source: Iranian Weapons of Mass Destruction. Anthony Cordesman CSIS and Dr. Abdullah Toukan)

## Comparative Major Surface-to-Air and Ballistic Missile Defense Launcher Strength without US and Other Allied Aircraft



	Yemen	Iraq	Saudi	Bahrain	Kuwait	Oman	Qatar	UAE	GCC Total	Iran
Patriot PAC-3					16			some	16	
Patriot PAC-2			96		40				136	
I-Hawk (MIM-23B)			128	6	24			some	158	150
SA-2 Guideline										
SA-3	some									
SA-5 Gammon										10
SA-6 Gainful	some									
TOR-M1										29

Source: Adapted by Anthony H. Cordesman and Garrett Berntsen from IISS, *Military Balance*, 2014 and IHS Jane's Sentinel series

## Gulf Land-Based Air Defenses In 2012

Country	Major SAM	Light SAM	AA Guns
Bahrain	6 Hawk MM-23B	60 RB-70 18 FIM-92A Stinger 7 Crotale	24 Guns: 12 Oerlikon 35mm 12 L-70 40mm
Iran	16/150 I Hawk 3/10 SA-5 10 SA-3 Gammion 45 SA-2 Guideline	SA-7/14/16 HQ-7 29 SA-15 Some QW-1 Micoq 29 TOR-M1 Some HN-5 3/30 Rapier 10 Pantsyr (SA-22) 250 FM-80 (CH Crotale) 15 Tigercat Some FIM-92A Stinger	1,122 Guns ZSU-23-4 24mm ZPU-2/4 14.5mm ZU-23 23mm M-1939 37mm S-60 57mm 80 ZSU-57-2
Iraq			
Kuwait	5/24 I Hawk Phase III 4/30 Patriot PAC-2	12 Aspide 12 Starburst Aspide Stinger	
Oman		Blowpipe 8 Mistral 25P 12 Pantsyr SLE 34 SA-7 6 Blindfire 5713 Martello 30 Javelin 40 Rapier	26 guns: 4 ZU-23-2 23mm 10 GDF-005 Skyguard 35 12 L-60 40mm
Qatar		10 Blowpipe 12 FIM-92A Stinger 9 Roland II 24 Mistral 20 SA-7	
Saudi Arabia	16/128 I Hawk 4-6/16-24 Patriot 2 17/73 Shahine Mobile (JAG)	40 Crotale 500 Stinger (ARMY) 500 Mistral (ADF) 400 FIM-43 Radeye 500 Radeye (ADF) 73-141 Shahine static 400 FIM-92A Avenger	1,230 guns: 92 M-163 Vulcan 20mm 30 M-167 Vulcan 20mm 50 AMD-30SA 30mm 128 GDF Oerlikon 35mm 150 L-70 40mm (in store) 150 M-2 90mm (JAG)
UAE	24/36 I Hawk Patriot PAC-3	20 + Blowpipe 20 Mistral Some Rapier Some Crotale Some RB-70 Some Javelin Some SA-18 Grouse	62 guns: 42 M-3VDA 20mm SP 20 GCF-BM2 30mm
Yemen	Some SA-2, 3 Some SA-6 Sp	Some 800 SA-7 Some SA-9 SP Some SA-13 SP Some SA-14	530 guns: 20 M-163 Vulcan SP 20mm 50 ZSU-23-4 SP 23mm 100 ZSU-23-2 23mm 150 M-1939 37mm 50M-167 20mm 120 S-60 57mm 40M-1939 KS-12 85mm

Source: Adapted by Anthony H. Cordesman and Garrett Berntsen from IISS, *Military Balance*, 2014 and IHS Jane's Sentinel series

***GCC Challenged in  
Seapower Without US,  
British, and French Power  
Projection, but Major Lead in  
Total Modern Air-Sea Assets***



## Iranian Reliance on Aging/Mediocre Systems – Naval

**FSGM** 1 *Jamaran* (UK Vosper Mk 5 – 1 more under construction at Bandar-e Abbas, expected ISD 2013) with 2 twin Inchr with CSS-N-4 *Sardine* AShM, 2 Inchr with SM-1 SAM, 2 triple 324mm ASTT, 1 76mm gun, 1 hel landing platform

### **FSG 4**

3 *Alvand* (UK Vosper Mk 5) with 2 twin Inchr with CSS-N-4 *Sardine* AShM, 2 triple 324mm ASTT, 1 114mm gun

1 *Bayandor* (US PF-103) with 2 twin Inchr with C-802 ASHm, 2 triple 324mm ASTT, 2 76mm gun

**FS** 1 *Bayandor* (US PF-103) with 2 76mm gun

**PCFG** 13 *Kaman* (FRA *Combattante II*) with 1–2 twin Inchr with CSS-N-4 *Sardine* AShM

**MSI** 2 *Riazi* (US *Cape*)

**LSM** 3 *Farsi* (ROK) (capacity 9 tanks; 140 troops)

**LST** 4 *Hengam* each with up to 1 hel (capacity 9 tanks; 225 troops)

**LSL** 6 *Fouque*

Upgrades?

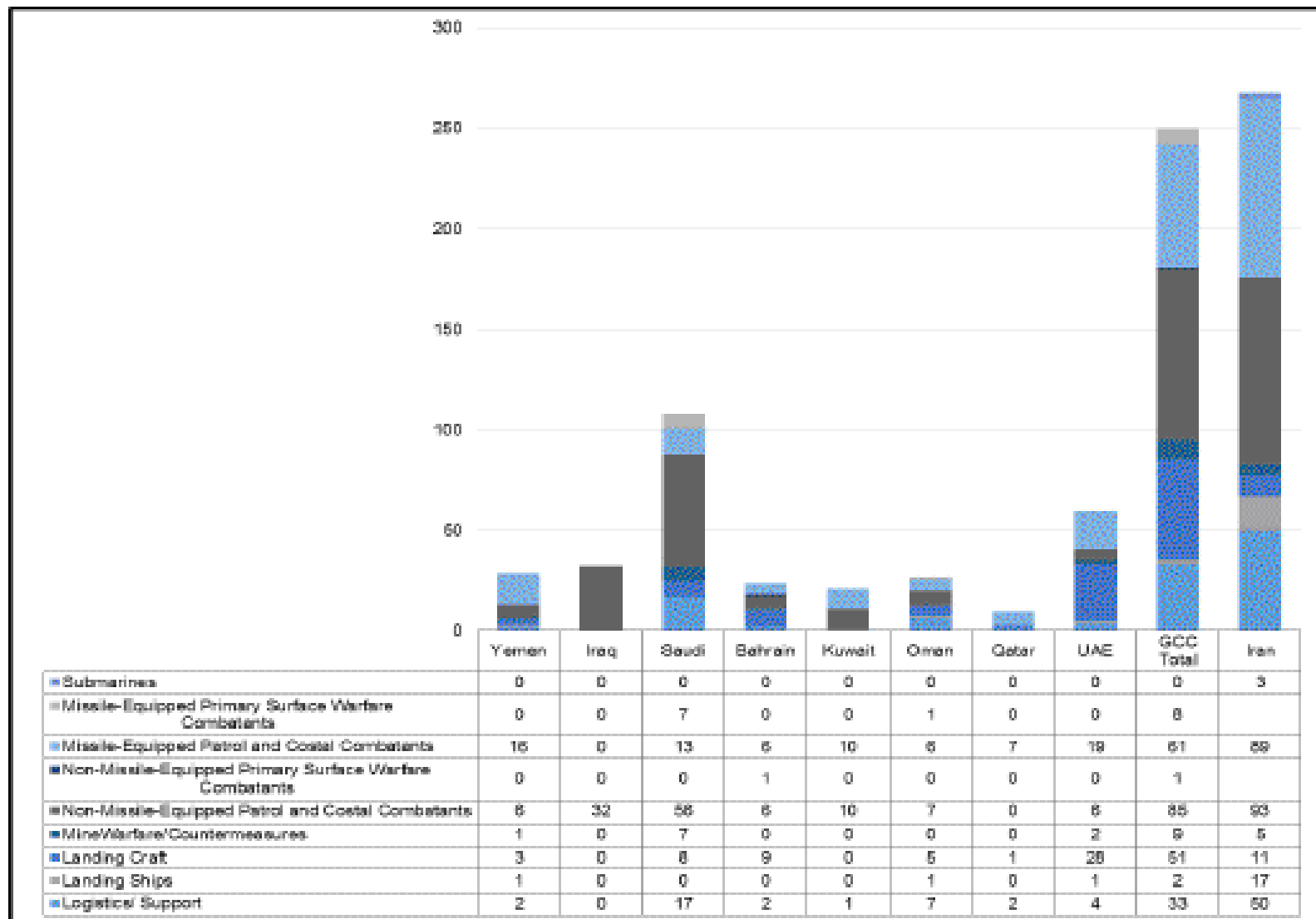
Does it matter?

ASMs?

SSMs?

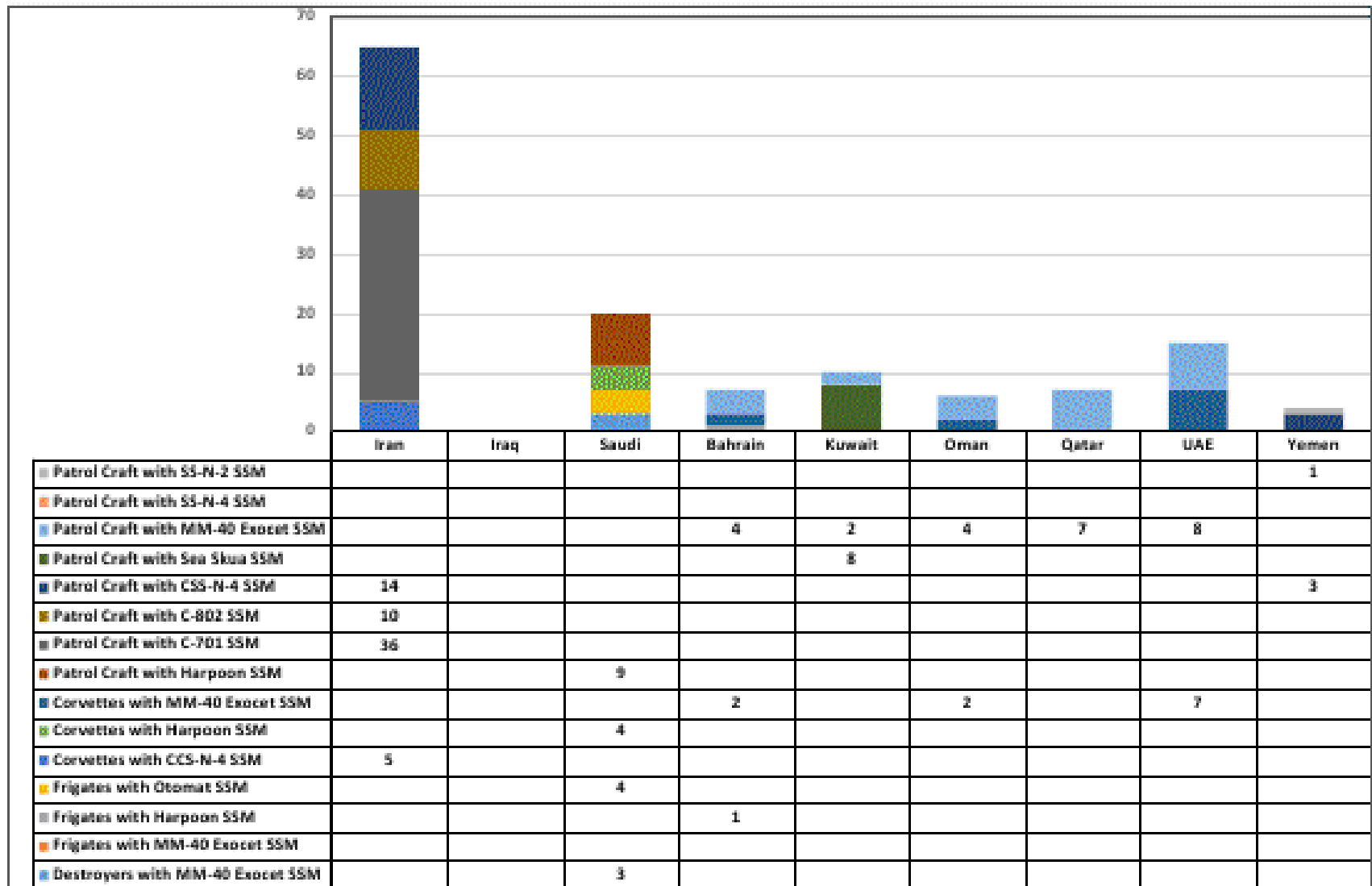
Air/UAVs?

## Comparative Combat Ship Strength without US and Other Allied Forces



Source: Adapted by Anthony H. Cordesman and Garrett Barntsen from IISS, *Military Balance*, 2014 and IHS Jane's Sentinel series

# Missile-Armed Combat Warships



Source: Adapted from IISS, The Military Balance, Periscope, JCSS, Middle East Military Balance, Jane's Sentinel and Jane's Defense Weekly. Some data adjusted or estimated by the author.

# ***The Asymmetric Balance in the Gulf***

## **Most Likely Iranian 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.**

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## The Key Challenge: 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.*

# Iranian Gulf Military Installations

**Bandar-e Khomeini** (30°25'41.42"N, 49° 4'50.18"E)

**Bandar-e Mahshahr** (30°29'43.62"N, 49°12'23.91"E)

**Khorramshahr** (30°26'2.71"N, 48°11'34.25"E)

**Khark Island** (29°14'48.01"N, 50°19'48.88"E)

**Bandar-e Bushehr** (28°58'2.58"N, 50°51'50.74"E)

**Asalouyeh** (27°27'21.08"N, 52°38'15.55"E)

**Bandar-e Abbas** (Naval base: 27° 8'35.79"N, 56°12'45.61"E; IRGCN missile boat base: 27° 8'30.91"N, 56°12'5.58"E; IRGCN torpedo & MLRS boat base: 27° 8'21.13"N, 56°11'53.28"E; Hovercraft base and nearby naval air strip: 27° 9'15.68"N, 56° 9'49.97"E)

**Jask** (25°40'40.90"N, 57°51'4.54"E)

**Bostanu** (27° 2'58.22"N, 55°59'3.22"E)

**Chabahar**

IRGCN base. It is the farthest east of all of Iran's military port facilities.

**Qeshm** (26°43'10.09"N, 55°58'30.94"E)

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**Abu Musa** (25°52'22.32"N, 55° 0'38.62"E)

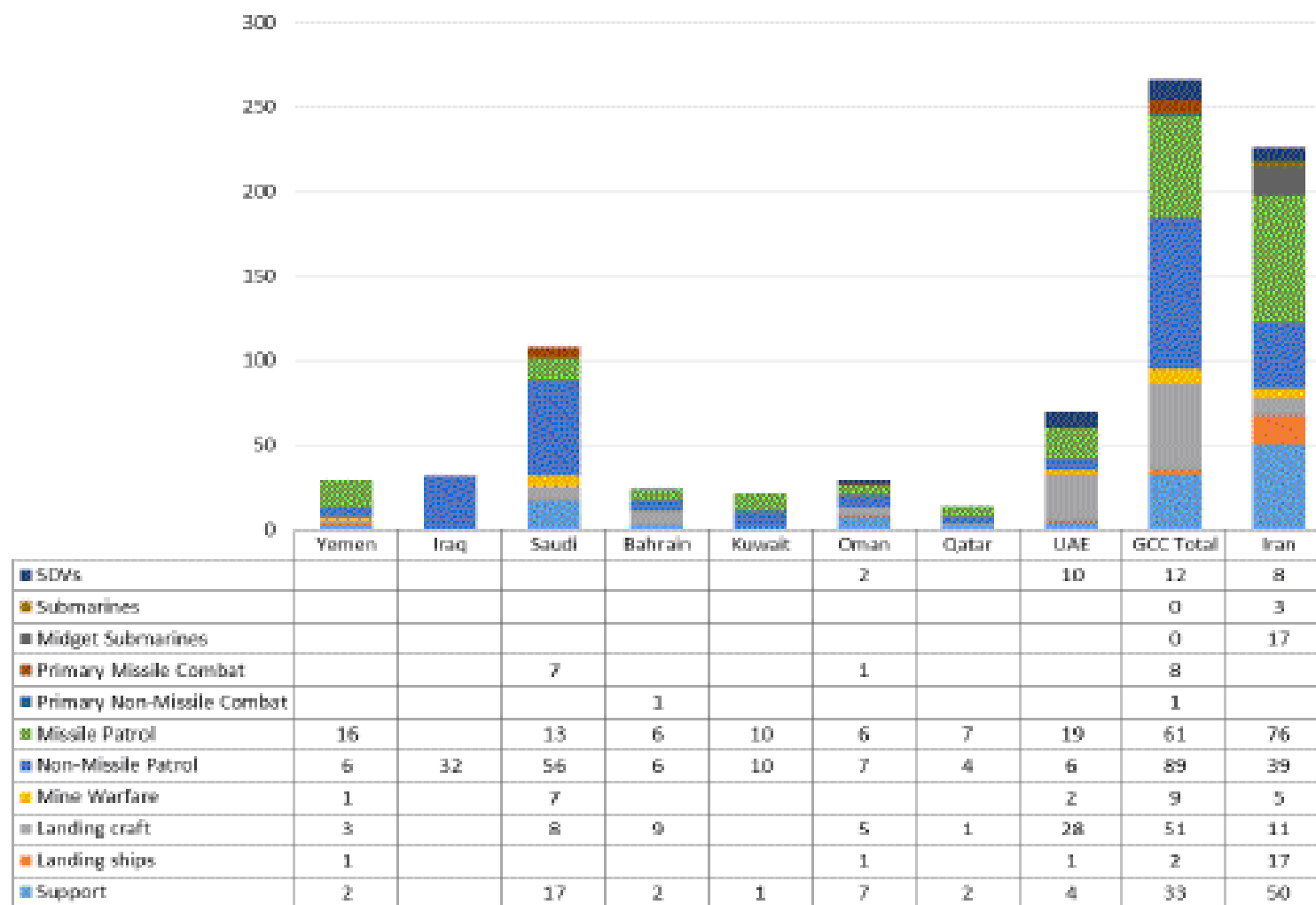
Occupied by Iran but claimed by the UAE. Suspected to house a small number of IRGCN forces. Also known to house HAWK SAMs and HY-2 "Silkworm" anti-ship missiles.

**Greater Tunb and Lesser Tunb** (GT: 26°15'54.33"N , 55°19'27.75"E; LT: 26°14'26.08"N, 55° 9'21.18"E)

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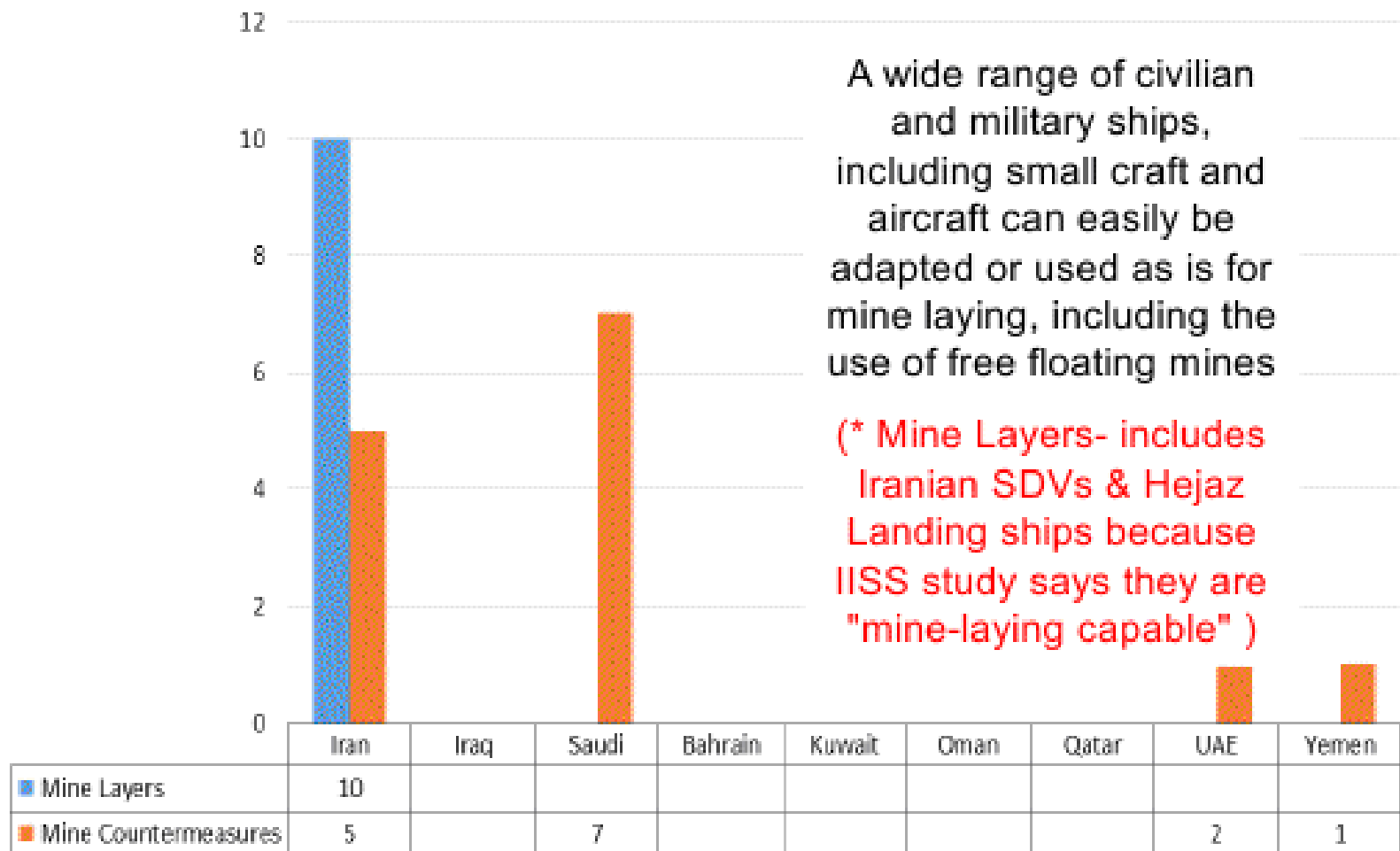


## Comparative Asymmetric Ship and Boat Strength without US and Other Allied Forces

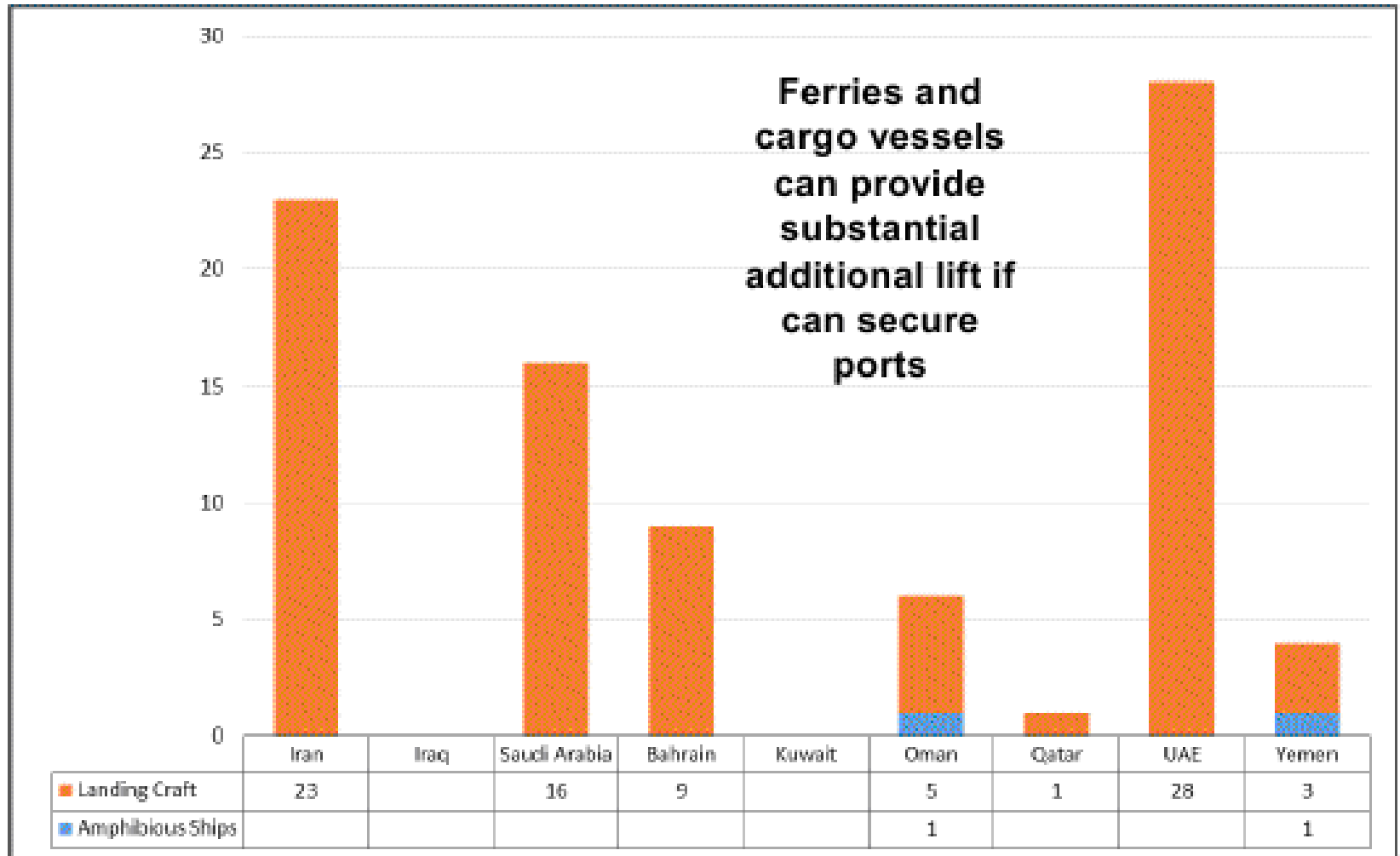


Source: Adapted by Anthony H. Cordesman and Garrett Berntsen from IISS, *Military Balance*, 2014 and IHS Jane's Sentinel series

# Mine Warfare Ships



# Amphibious Ships & Landing Craft



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

# IRGC Naval Forces

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.

Large numbers of anti-ship missiles on various types of launch platforms.

Small fast-attack craft, heavily armed with rockets or anti-ship missiles.

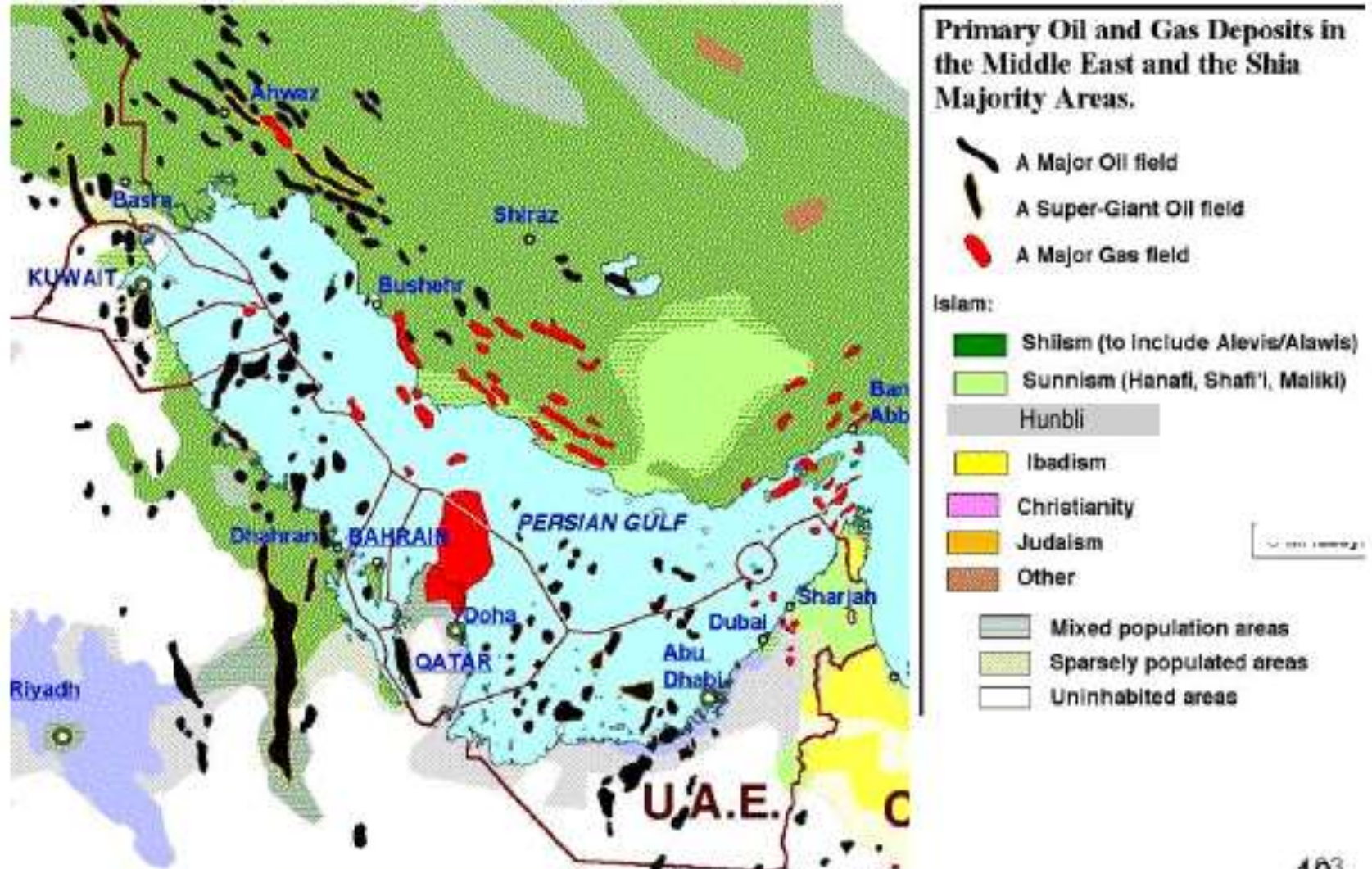
# ***Gulf Air-Sea-Raid-Sabotage Dynamics***

# You Don't have to break a Bottle at the Neck





# Vulnerability of Gulf Oil Fields



Source: M. Izady, 2006 <http://gulf2000.columbia.edu/maps.shtml>

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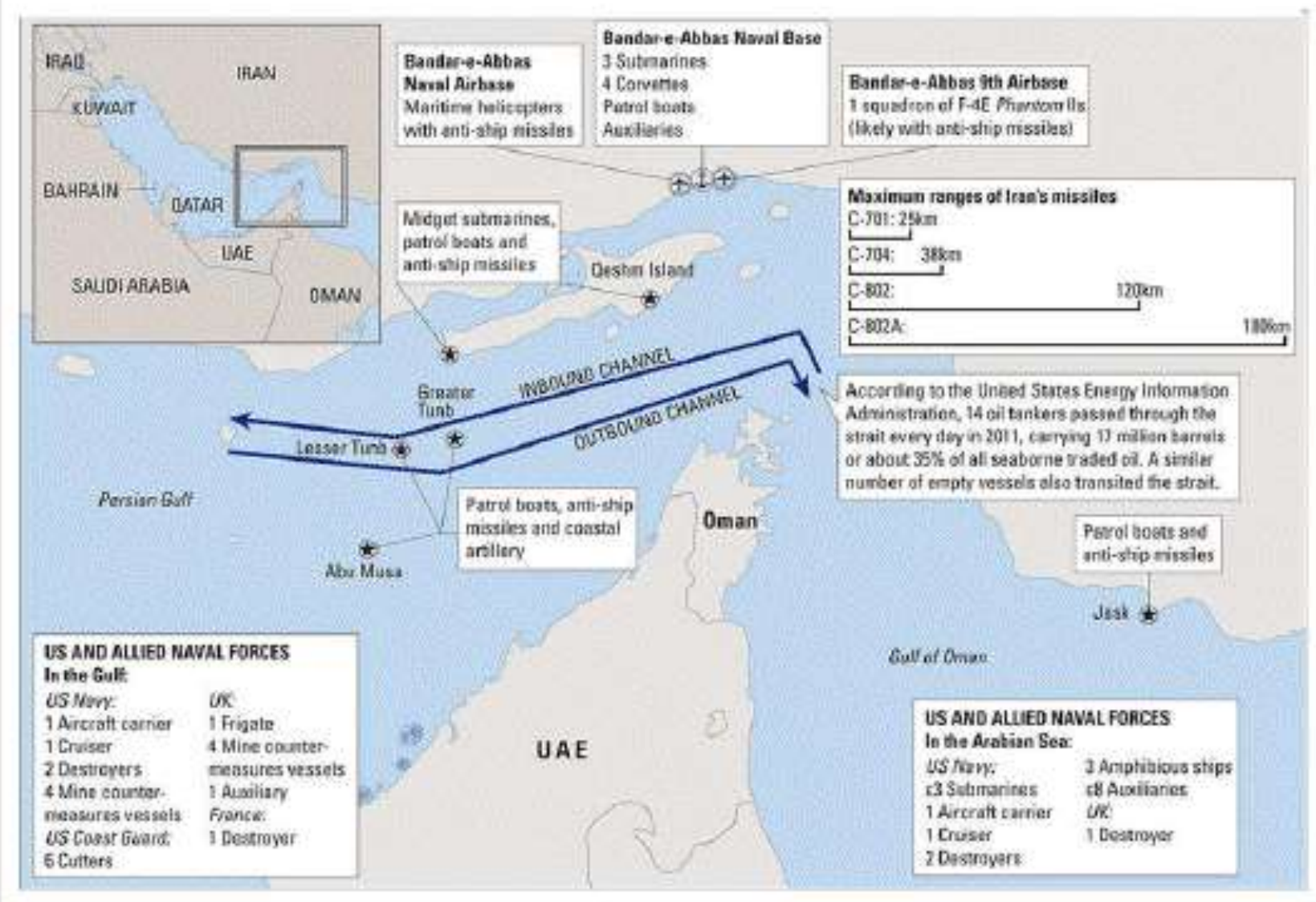
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## Strait of Hormuz: Iranian, US and Allied assets in the region





# Abu Musa

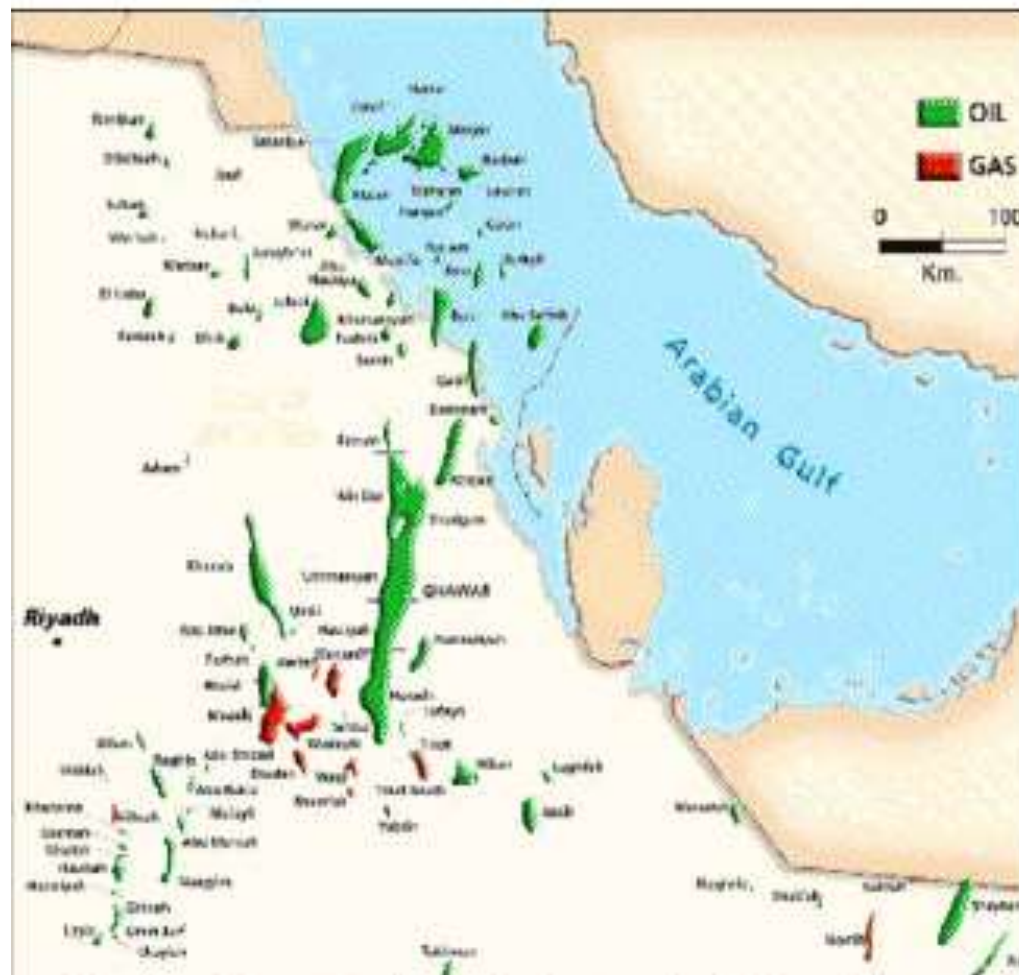


107

## Map of Arabian Sea



# Saudi Arabian Oil Exports



Pipelines: Domestic: Abqaiq-Yanbu Petrolene (5.0), Abqaiq-Yanbu NGL line (0.3); International: Saudi Arabia-Bahrain (estimated 0.7), Saudi Arabia-Iraq or IPS (1.6 – closed since August 1990), TransArabia Tapline (0.5 – closed since 1984)

260 billion barrels of proven oil reserves (plus 2.5 billion barrels in the Saudi-Kuwaiti shared "Neutral" Zone), amounting to around one-fifth of proven, conventional world oil reserves.

Although Saudi Arabia has around 100 major oil and gas fields (and more than 1,500 wells), over half of its oil reserves are contained in only eight fields, including the giant 1,260-square mile Ghawar field (the world's largest oil field, with estimated remaining reserves of 70 billion barrels). The Ghawar field alone has more proven oil reserves than all but six other countries.

Saudi Arabia maintains the world's largest crude oil production capacity, estimated by U.S. Energy Information Administration (EIA) at over 12 million bbl/d at end-2010. Over 2 million bbl/d of capacity was added in 2009 with the addition of increments at Khurais, AFK (Abu Hadriya, Fadhi and Khursariyah), Shaybah, and Nu'ayyin. For 2010, the EIA estimates that Saudi Arabia produced on average 10.2 million bbl/d of total oil.

Saudi Arabia has three primary oil export terminals:

- The Ras Tanura complex has approximately 6 million bbl/d capacity, and the world's largest offshore oil loading facility. It includes the 2.5-million bbl/d port at Ras Tanura. More than 75 percent of exports are loaded at the Ras Tanura Facility.
- The 3 to 3.6-million bbl/d Ras al-Ju'aymah facility on the Persian Gulf.
- The Yanbu' terminal on the Red Sea, from which most of the remaining 25 percent is exported, has loading capacity of approximately 4.5 million bbl/d crude and 2 million bbl/d for NGL and products. The facility is reportedly not used to full capacity.

These and a dozen other smaller terminals throughout the country, appear capable of exporting up to 14-15 million bbl/d of crude and refined products, 3-4 million bbl/d higher than Saudi Arabia's current crude oil production capacity.



## Ras Tanura



110

Source: Google maps

110  
0

## Desalination Plant



# Iranian Oil Facilities



Kharg Island, the site of the vast majority of Iran's exports, has a crude storage capacity of 20.2 million barrels of oil and a loading capacity of 5 million bbl./d.

Lavan Island is the second-largest terminal with capacity to store 5 million barrels and loading capacity of 200,000 bbl./d.

Other important terminals include Kish Island, Abadan, Bandar Mahshahr, and Neka (which helps facilitate imports from the Caspian region).

Iran has an extensive domestic oil network including more than 10 pipelines that run between 60 and 630 miles in length.

Iran has invested in its import capacity at the Caspian port to handle increased product shipments from Russia and Azerbaijan, and enable crude swaps with Turkmenistan and Kazakhstan.

In the case of crude swaps, the oil from the Caspian is consumed domestically in Iran, and an equivalent amount of oil is produced for export through the Persian Gulf with a Swiss-banking arm of NIOC for a swap fee.

According to FGC, Khatam Al-Abia Construction Headquarters (KACH), the construction company controlled by Iran's Islamic Revolutionary Guard Corps (IRGC), was awarded a new contract by NIOC worth \$1.3 billion to build two oil pipelines.

The new oil pipelines will total 584 miles and will deliver crude oil from the Khuzestan Province to the Tehran oil refinery.

In addition, KACH is constructing three other pipelines that will deliver crude oil and petroleum products. These include the Nayen-Kashan, Rafsanjan-Mashhad, and Bandar Abbas-Rafsanjan pipelines.



## **Key Targets that Illustrate Iran's Vulnerability**

- **Critical dependence on refineries with high cost, long lead facilities and on imports of product.**
- **Minimal power grid that can be crippled or destroyed selectively on a regional or national basis.**
- **Gas production and distribution facilities needed by Iran's domestic economy.**
- **Key bridges, tunnels, overpasses and mountain routes for road and rail traffic.**
- **Gulf tanker loading facilities, oil storage and and tanker terminals – for mining or direct attack.**
- **Key military production facilities**
- **Command and control centers.**
- **Communications grids.**
- **Airfield and air bases.**
- **IRGC land, air, and naval facilities.**
- **Coastal naval bases and port facilities.**

# ***The Emerging Missile Threat***

# Missiles and States with Nuclear Weapons

Iran	SRBM < 1000 km	MRBM 1,000 – 3,000 km	IRBM 3,000 – 5,500 km	ICBM > 5,500 km
	Shahab-1	Shahab-3	Shahab-5	Shahab-6
	Shahab-2	Shahab-4	-	-
	Musabak-120	Shahab-120	-	-
	Musabak-180	Shahab-180	-	-
	Musabak-200	Shahab-200	-	-
Syria	SRBM < 1000 km	MRBM 1,000 – 3,000 km	IRBM 3,000 – 5,500 km	ICBM > 5,500 km
	SCUD-B	-	-	-
	SCUD-C	-	-	-
	SCUD-D	-	-	-
	SS-21b	-	-	-
Israel	IRBM < 1000 km	MRBM 1,000 – 3,000 km	IRBM 3,000 – 5,500 km	ICBM > 5,500 km
	-	Jaricho II	-	Jaricho III
Pakistan	SRBM < 1000 km	MRBM 1,000 – 3,000 km	IRBM 3,000 – 5,500 km	ICBM > 5,500 km
	Shaheen I	Shaheen II	-	-
	Hafid I	Ghauri I	-	-
	Hafid II	Ghauri II	-	-
	Hafid III	Ghauri III	-	-
India	SRBM < 1000 km	MRBM 1,000 – 3,000 km	IRBM 3,000 – 5,500 km	ICBM > 5,500 km
	Agni I	Agni II	Agni III	Surya
	Prithvi I	-	-	-
	Prithvi II	-	-	-



Iran is the only state between the four that has signed and ratified the NPT Treaty.

Iran has been heavily investing in:

- Precision Strike Munitions
- Naval anti-ship weapons, such as the Chinese C802 that hit the Israeli Navy ship during the 2006 war in Lebanon and the Ra'ad 350 km anti-ship missile
- Ballistic Missiles
- Cruise Missiles such as the Kh-55 Russian land attack cruise missile, effective against Oil Platforms

SRBM : Short Range Ballistic Missile

MRBM : Medium Range Ballistic Missile

IRBM : Intermediate Range Ballistic Missile

ICBM : Intercontinental Ballistic Missile

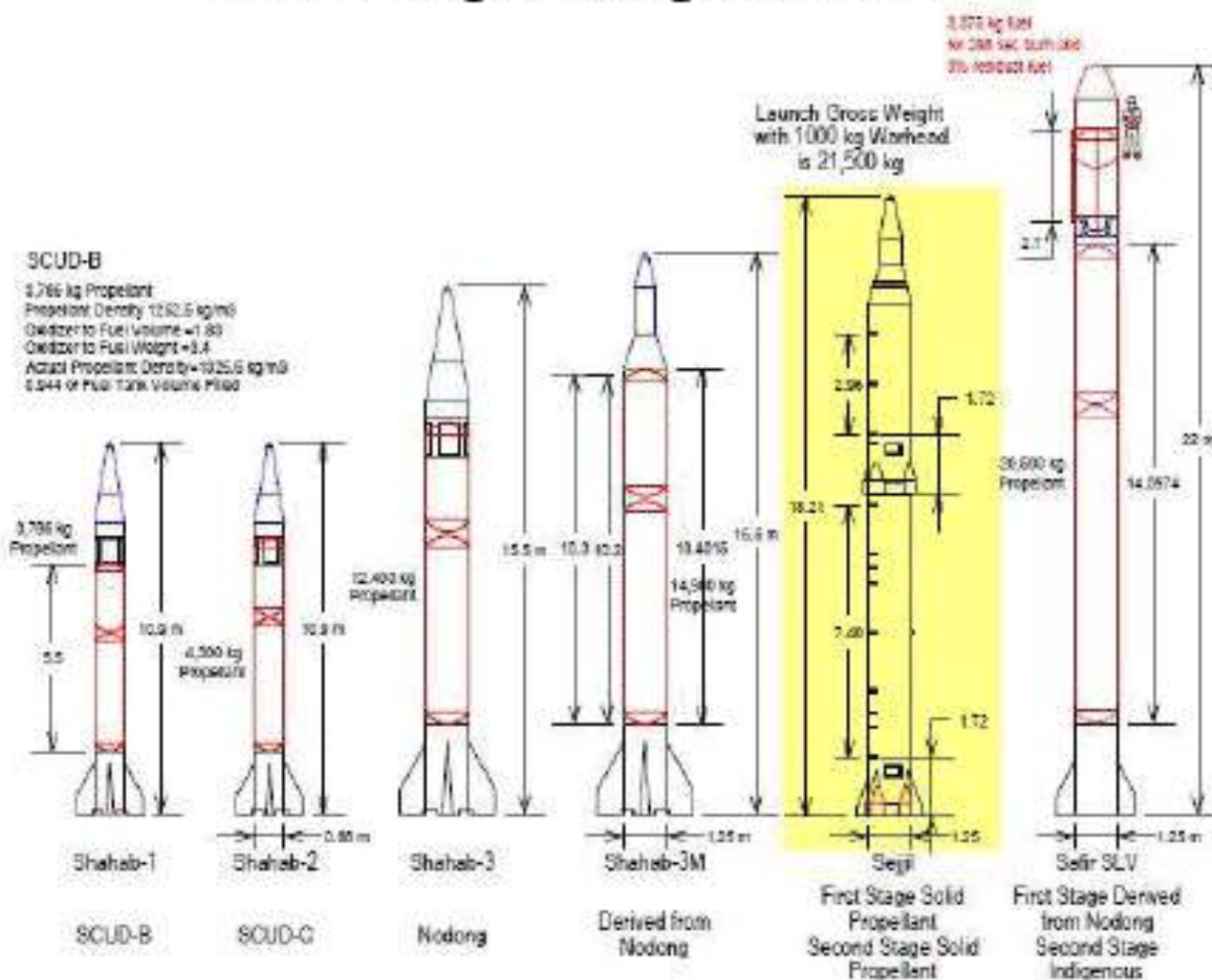
# Iran: Major Open Source Missile and WMD Facilities



Source: NTI, <http://www.nti.org/imap/?country=iran&layers>, September 2012



# Iran's Longer-Range Missiles



(Reference: Theodore Postol, "A Technical Assessment of Iran's Ballistic Missile Program" May 6, 2009. Technical Addendum to the Joint Threat Assessment on Iran's Nuclear And Missile Potential.)

## THE RANGE OF IRAN'S SHAHAB-3

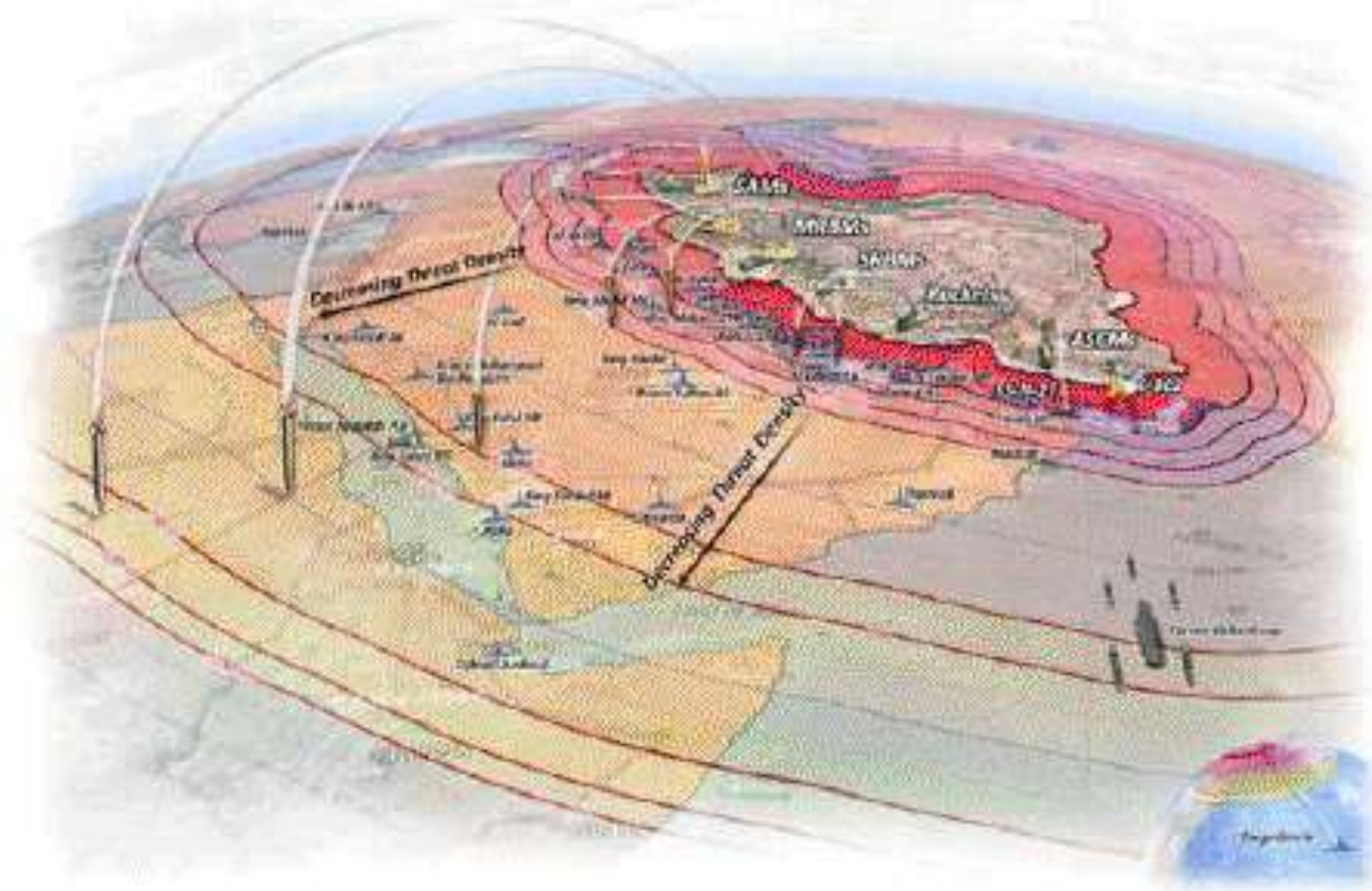


Source: Stratfor.

[http://www.google.com/imgres?imgurl=http://digitaljournal.com/img/t/2/2/8/5/5/5/7/1/iran\\_missile\\_map.jpg&imgrefurl=http://digitaljournal.com/image/57146&h=364&w=400&sz=56&imgid=nAmeBQ-GpErdwGM\\_6tbnh=30&tbnw=99&zoom=1&docid=fh58K5y8X5dAM&sa=X&ei=A947T\\_D9NcbR0gHyMjRCw&red=0CDUQ9QEwAw&dur=235](http://www.google.com/imgres?imgurl=http://digitaljournal.com/img/t/2/2/8/5/5/5/7/1/iran_missile_map.jpg&imgrefurl=http://digitaljournal.com/image/57146&h=364&w=400&sz=56&imgid=nAmeBQ-GpErdwGM_6tbnh=30&tbnw=99&zoom=1&docid=fh58K5y8X5dAM&sa=X&ei=A947T_D9NcbR0gHyMjRCw&red=0CDUQ9QEwAw&dur=235)



## Missile Attack Range and Density



Source: Adapted from Mark Gunzinger and Christopher Dougherty, *Outside-In Operating from Range to Defeat Iran's Anti-Access and Area-Denial Threats*, CB&A, Washington DC, 2011..

## Missile Attack Timing



Source: Adapted from Mark Gunzinger and Christopher Dougherty, *Outside-In Operating from Range to Defeat Iran's Anti-Access and Area-Denial Threats*, OCSA, Washington DC, 2011..



## Missile Accuracy, Reliability, and Targeting

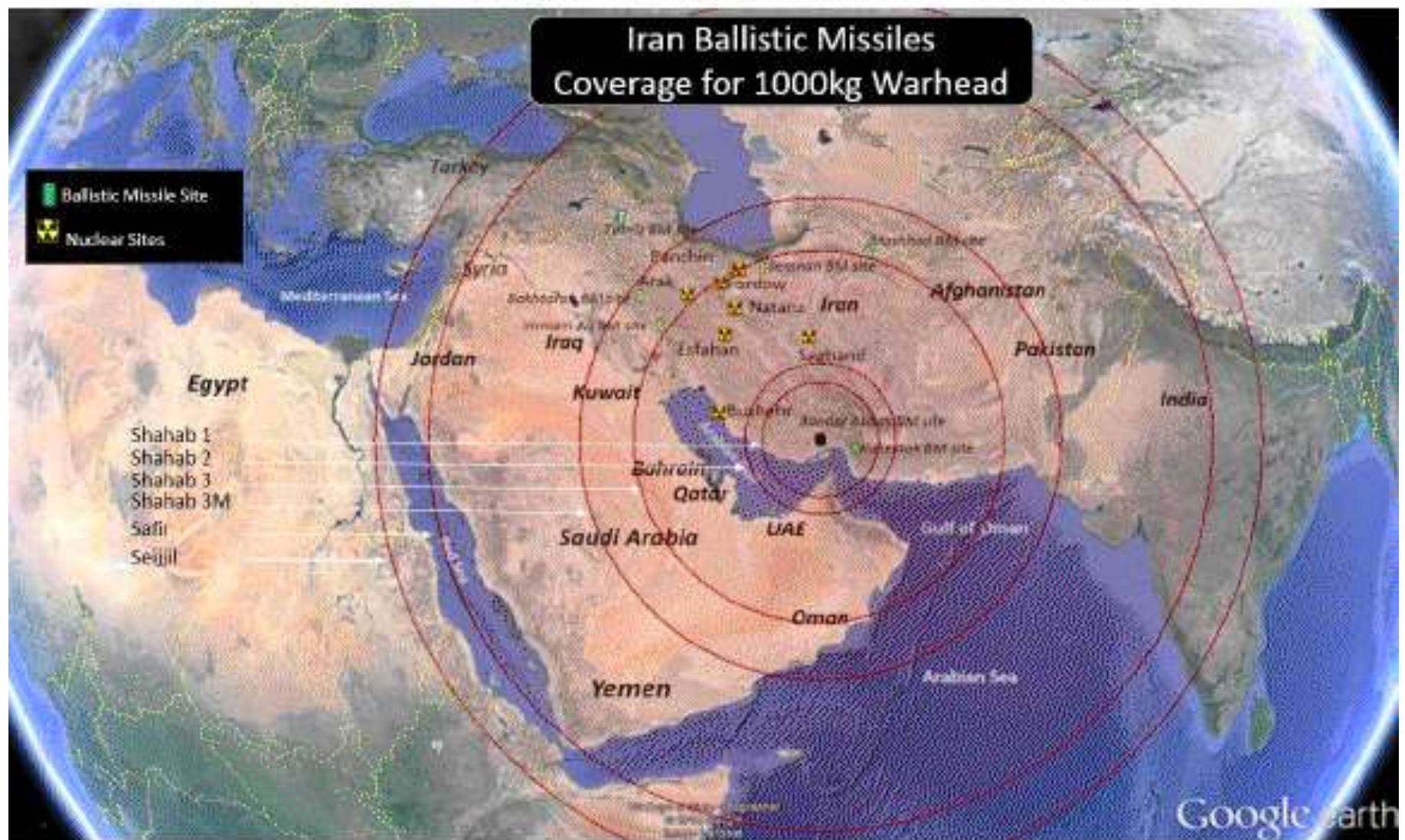


Iran's 'Great Prophet 7' exercise in July was explicitly designed to show that it is capable of targeting US bases in the region. A range of Iranian ballistic missiles and rockets were fired from different locations at a model air base that had been constructed in the desert 90 km southeast of the Semnan Space Centre. This DigitalGlobe satellite imagery shows the accuracy achieved during the exercise.

# ***Missile Defense and Missile Wars***

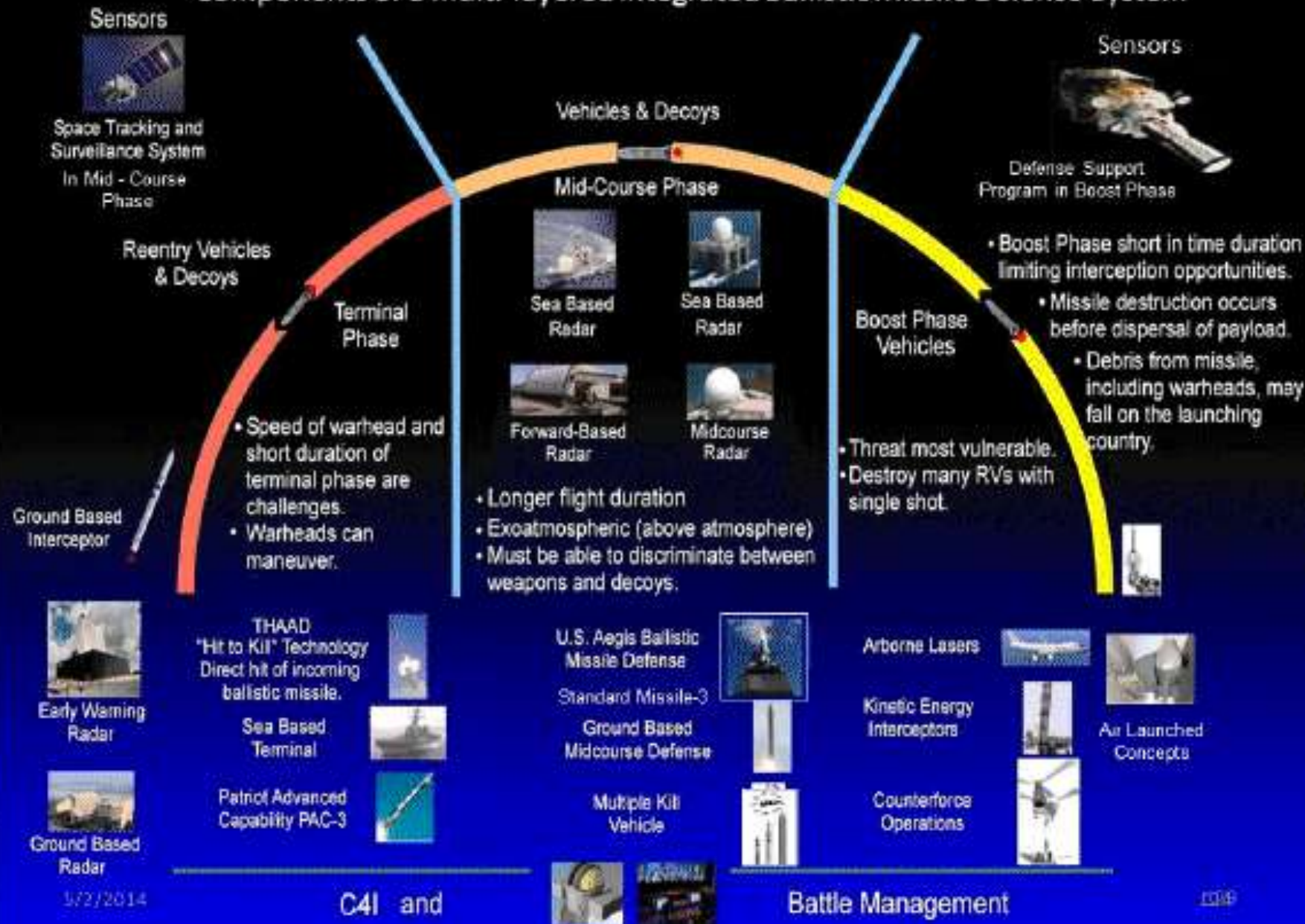


# Range of Iran's Ballistic Missiles





# Components of a multi-layered integrated Ballistic Missile Defense System



# Sea Based Air Defenses

## U.S. Navy's Role in Missile Defense Network

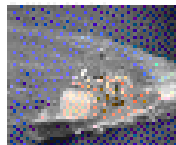
### Role of the U.S. Navy Aegis System:

- Will provide an efficient and highly mobile sea-based defense against Short and Medium – Range Ballistic Missiles in their midcourse phase.
- The system will allow the BMD Command to move its defense capabilities close to the enemy sites.
- The system will have the Engagement & Long Range Tracking Capability
- Intercepting Short to Medium Range Ballistic Missiles in the midcourse phase of the flight with Standard Missile – 3.
- Serves as a forward deployed sensor, providing early warning and long range search & track capabilities for ICBMs and IRBMs.

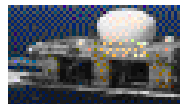
### Contributions:

- Will extend the battle space of the BMDs and contribute to an integrated layered defense. The Naval Aegis system extends the range of the Ground Missile defense (GMD) element by providing reliable track data used to calculate firing solutions.
- Aegis BMD will coordinate engagements of short and medium range ballistic missiles with terminal missile defense systems.
- As tracking information is shared among these systems, the BMDs will have the opportunity to follow the engagement of a target during the midcourse segment with coordinated terminal engagements.

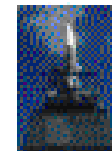
Sea  
Based  
Radar



Sea  
Based  
Radar



Aegis  
Ballistic  
Missile



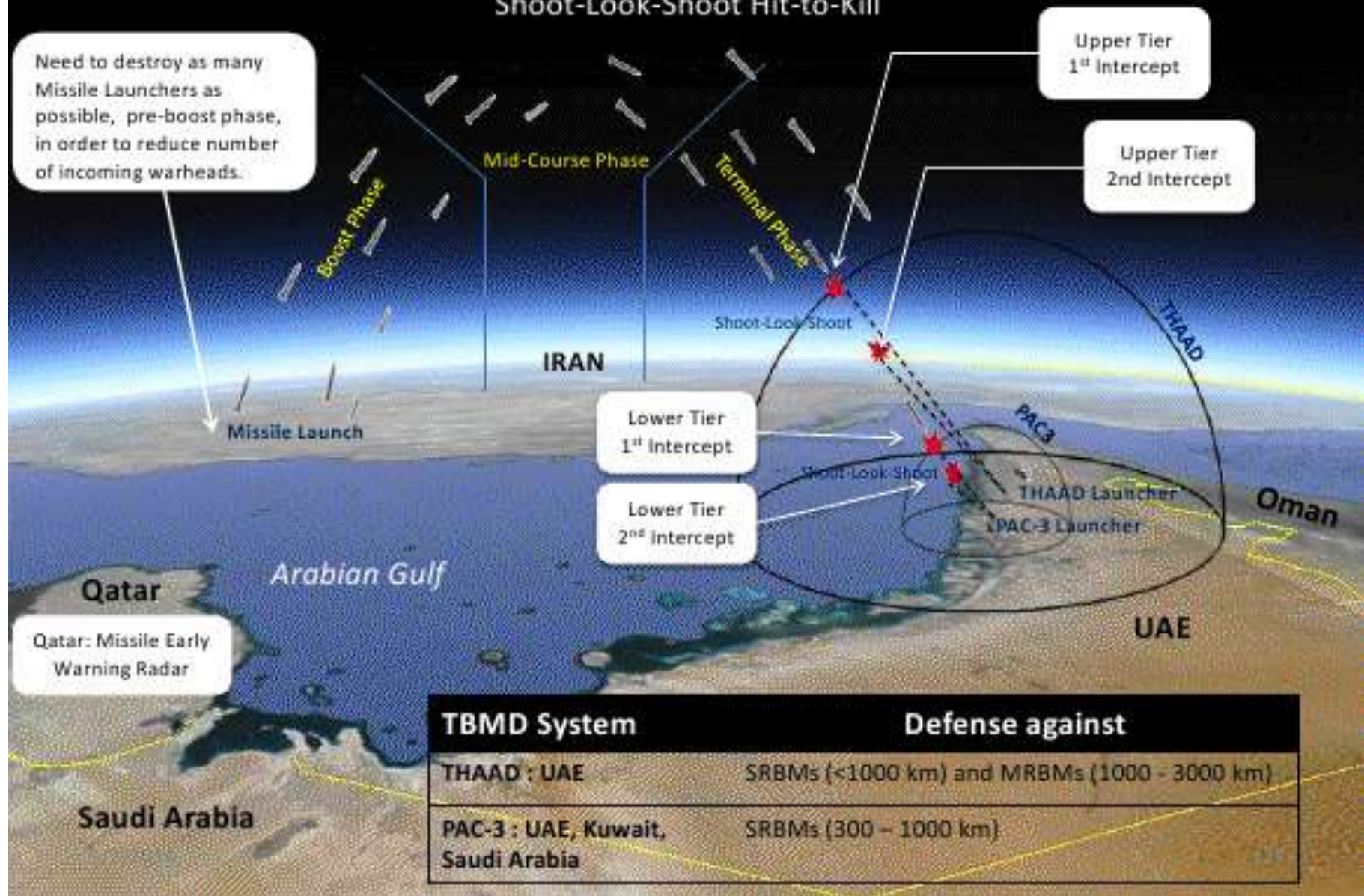
## GCC Missile Defense Upgrades

Country	TBMD System
UAE	<ul style="list-style-type: none"> <li>• The UAE is so far the first GCC country to buy the Terminal High Altitude Air Defense (THAAD) missile system.</li> <li>• On Dec 31, 2011 Pentagon announced that the UAE will be buying 2 full THAAD batteries, 96 missiles, 2 Raytheon AN/TPY-2 radars, and 30 years of spare parts. Total Value \$3.34 billion.</li> <li>• In 2008 the UAE ordered Patriot PAC-3: 10 fire units, 172 missiles, First delivery 2009.</li> </ul>
Kuwait	<p>July 2012, Pentagon informed Congress of a plan to sell Kuwait \$4.2 billion in weapon systems, including 60 PAC-3 missiles, 20 launching platforms and 4 radars. This will be in addition to the 350 Patriot missiles bought between 2007 and 2010. In 1992, Kuwait bought 210 of the earlier generation Patriots and 25 launchers. Kuwait bought a further 140 more in 2007.</p>
Saudi Arabia	<p>In 2011 Saudi Arabia signed a \$1.7 billion US contract to upgrade it's Patriot anti-missile system.</p>
Qatar	<p>The U.S. is building a Missile Warning Facility in Qatar that would utilize an AN/TPY-2-X Band Radar.</p>

(Source: Anthony Cordesman and Alexander Wilner, "Iran and the Gulf Military Balance -1" July 11, 2012)



## Two Tier Theater Ballistic Missile Defense (TBMD) – THAAD & PAC 3 Endo and Exo-Atmospheric Engagements using Shoot-Look-Shoot Hit-to-Kill

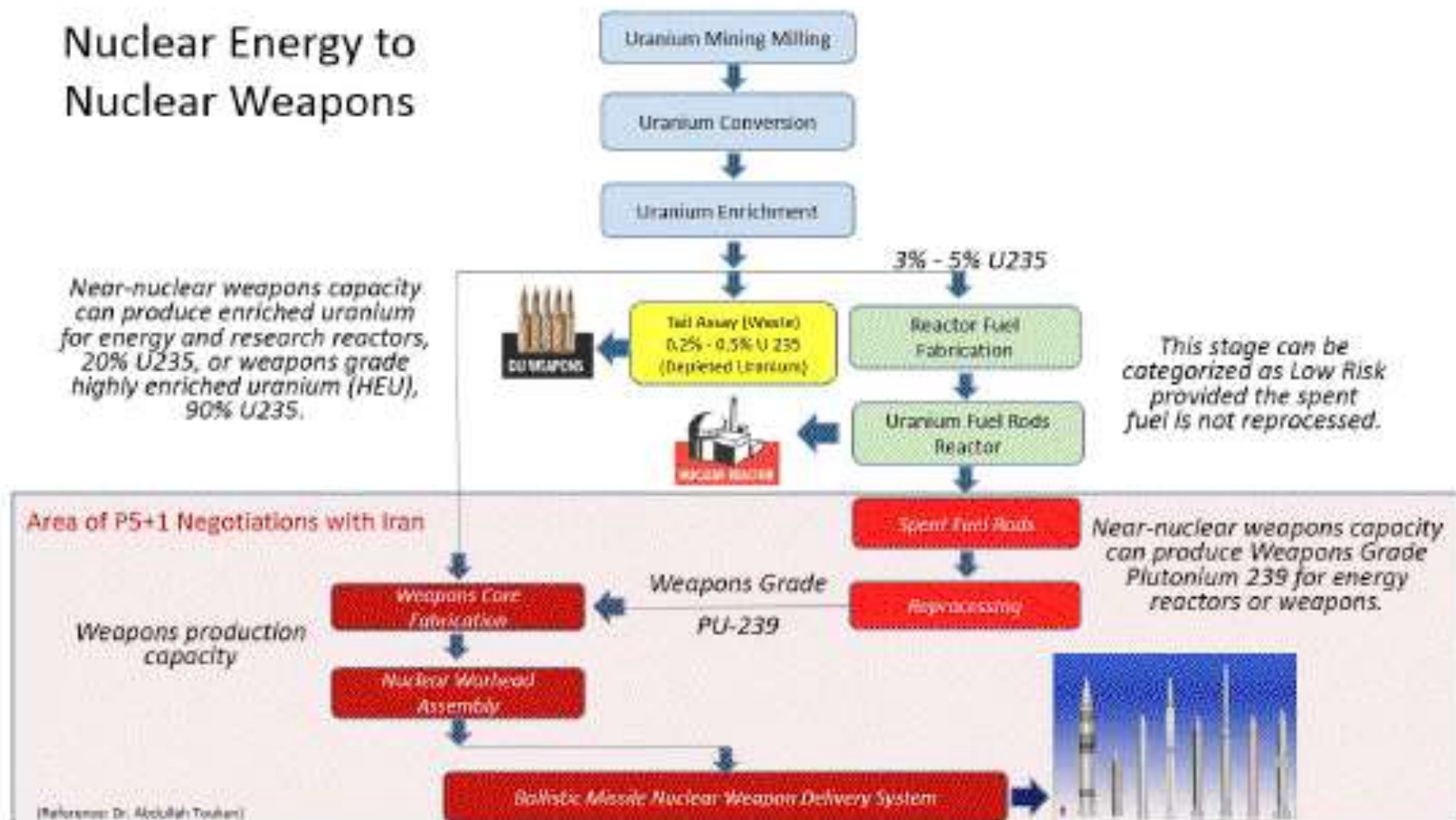


# ***Visualizing the Nuclear Threat***



# Iran's Nuclear Weapons Development Cycle

## Nuclear Energy to Nuclear Weapons





# Iran: The Broader Target List: 54+

## Nuclear-Conversion

- [Tehr. Ibn Hassan Multipurpose Laboratories \(IHL\)](#)
- [Rudan Conversion Facility](#)
- [Uranium Conversion Facility \(UCF\)](#)

## Nuclear-Education and Training

- [Amir Kabiir University of Technology](#)
- [Imam Hossein University \(IHU\)](#)
- [Institute for Studies in Theoretical Physics and Mathematics \(IPM\)](#)
- [Malek Ashtar University \(MAU\)](#)
- [Sharif University of Technology \(SUT\)](#)
- [University of Tehran \(UT\)](#)

## Nuclear-Enrichment

- [Jih of Tir Industries](#)
- [Defense Industries Organization \(DIO\)](#)
- [Faravard Technique](#)
- [Fordow Fuel Enrichment Plant](#)
- [Fuel Enrichment Plant \(FEP\)](#)
- [Kalaye Electric Company](#)
- [Kaveh Cutting Tools Company/Ahraz Boteh Kaveh Co](#)
- [Lashkar Abad](#)
- [Natanz Enrichment Complex](#)
- [Pars Trish](#)
- [Pilot Fuel Enrichment Plant \(PFEP\)](#)
- [Tehran Nuclear Research Center \(TNRC\)](#)

## Nuclear-Fuel Fabrication

- [Fuel Fabrication Laboratory \(FFL\)](#)
- [Fuel Manufacturing Plant \(FMP\)](#)
- [Zirconium Production Plant \(ZPP\)](#)

## Nuclear-Heavy Water Production

- [Heavy Water Production Plant \(HWPP\)](#)

## Nuclear-Mining and Milling

- [Ardakan Yellowcake Production Plant](#)
- [Bandar Abbas Uranium Production Plant \(BUP\)](#)
- [Sargard](#)

## Nuclear-Power Reactors

- [Dakhovin Nuclear Power Plant](#)

## Nuclear-Regulatory

- [Atomic Energy Organization of Iran \(AEOI\)](#)

## Nuclear-Reprocessing

- [Tehran Nuclear Research Center \(TNRC\)](#)

## Nuclear-Research Reactors

- [IR-40](#)
- [Miniature Neutron Source Reactor \(MNSR\)](#)
- [Tehran Research Reactor \(TRR\)](#)

## Nuclear-Research and Development

- [Bosrah Atomic Energy Research Center](#)
- [Graphite Sub-Critical Reactor \(ENTC-GSCR\)](#)
- [Heavy Water Zero Power Reactor \(ENTC-HWZPR\)](#)
- [Isfahan \(Esfahan\) Nuclear Fuel Research and Production Center \(NFRPC\)](#)
- [Isfahan \(Esfahan\) Nuclear Technology Center \(INTC\)](#)
- [Kara Agricultural and Medical Research Center](#)
- [Light Water Sub-Critical Reactor \(ENTC-LWSCR\)](#)
- [Plasma Physics Research Center](#)
- [Tehran Nuclear Research Center \(TNRC\)](#)
- [Yazd Radiation Processing Center \(YRPC\)](#)

## Nuclear-Waste Management

- [Anarak Waste Storage Facility](#)
- [Isfahan \(Esfahan\) Nuclear Waste Storage Facility](#)
- [Kara Waste Storage Facility](#)
- [Qom Waste Disposal Site](#)

## Nuclear-Weaponization

- [Institute of Applied Physics \(IAP\)](#)
- [Kimia Maadan Company \(KMC\)](#)
- [Pasdaran Military Complex](#)
- [Physics Research Center \(PHRC\)](#)
- [Tehran Nuclear Research Center \(TNRC\)](#)



## Natanz Upgrades in 2012



Source: Google <http://www.dailymail.co.uk/news/article-2060213/Google-releases-satellite-images-iranian-cities-UN-says-used-nuclear-weaponisation.html>



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 2004  
1



## Natanz: Effective Concealment



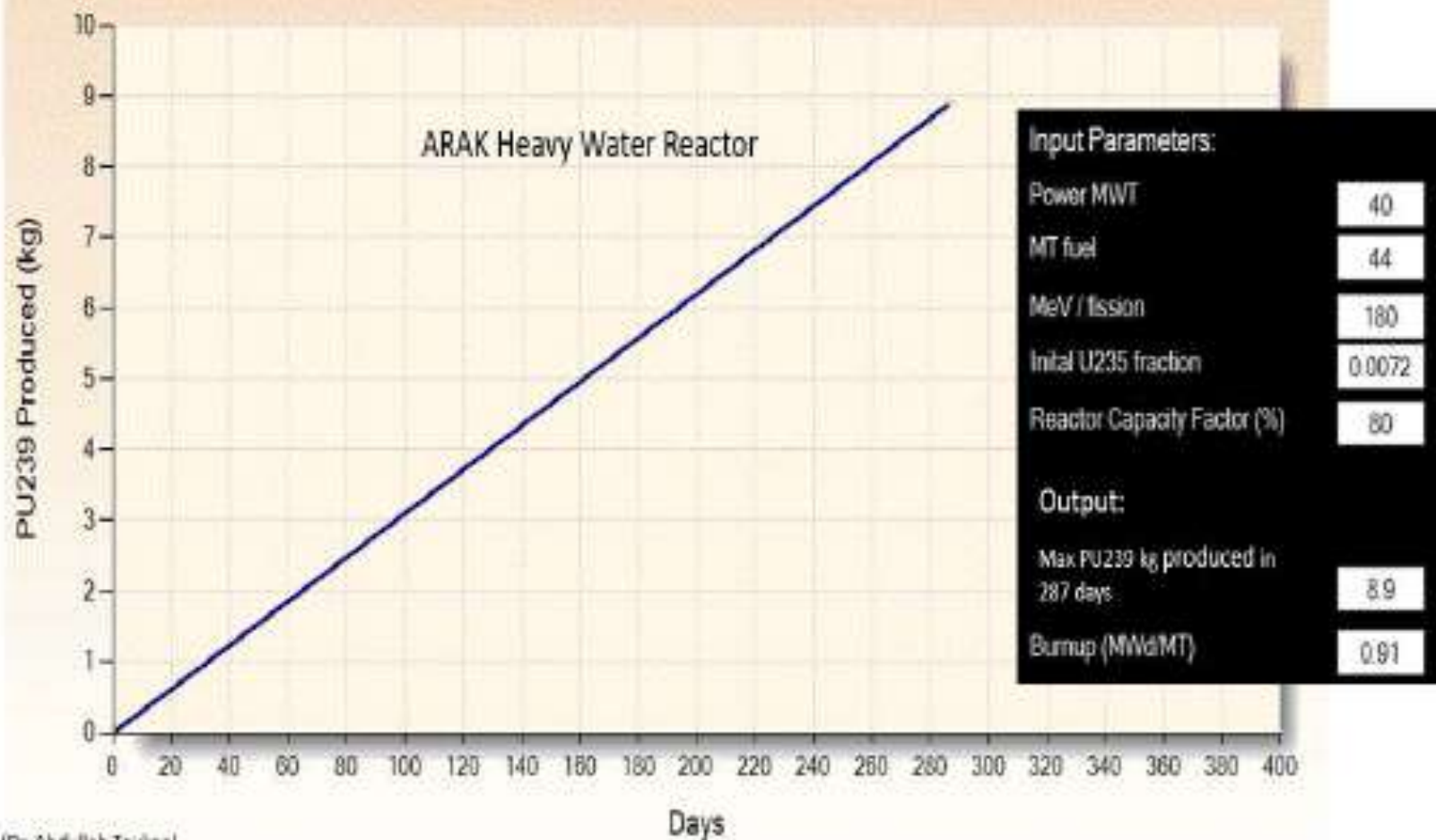
## Heavy Water Reactor Facility at Arak in 2011



Source: Google <http://www.dailymail.co.uk/news/article-2060213/Google-releases-satellite-images-iranian-cities-UN-says-used-nuclear-weaponisation.html>

# The Plutonium Threat from the Arak Reactor

Kg PU239 (99%) Weapons Grade Plutonium Production Reactor



(Dr. Abdullah Toukan)



## Fordow: 3,000 Centrifuges in a Mountain



Source: Ynet News: [http://www.google.com/imgres?imgurl=http://www.ynetnews.com/PicServer2/13062011/3669116/AFP0661600-01-08809249\\_wa.jpg&imgrefurl=http://www.ynetnews.com/articles/](http://www.google.com/imgres?imgurl=http://www.ynetnews.com/PicServer2/13062011/3669116/AFP0661600-01-08809249_wa.jpg&imgrefurl=http://www.ynetnews.com/articles/)

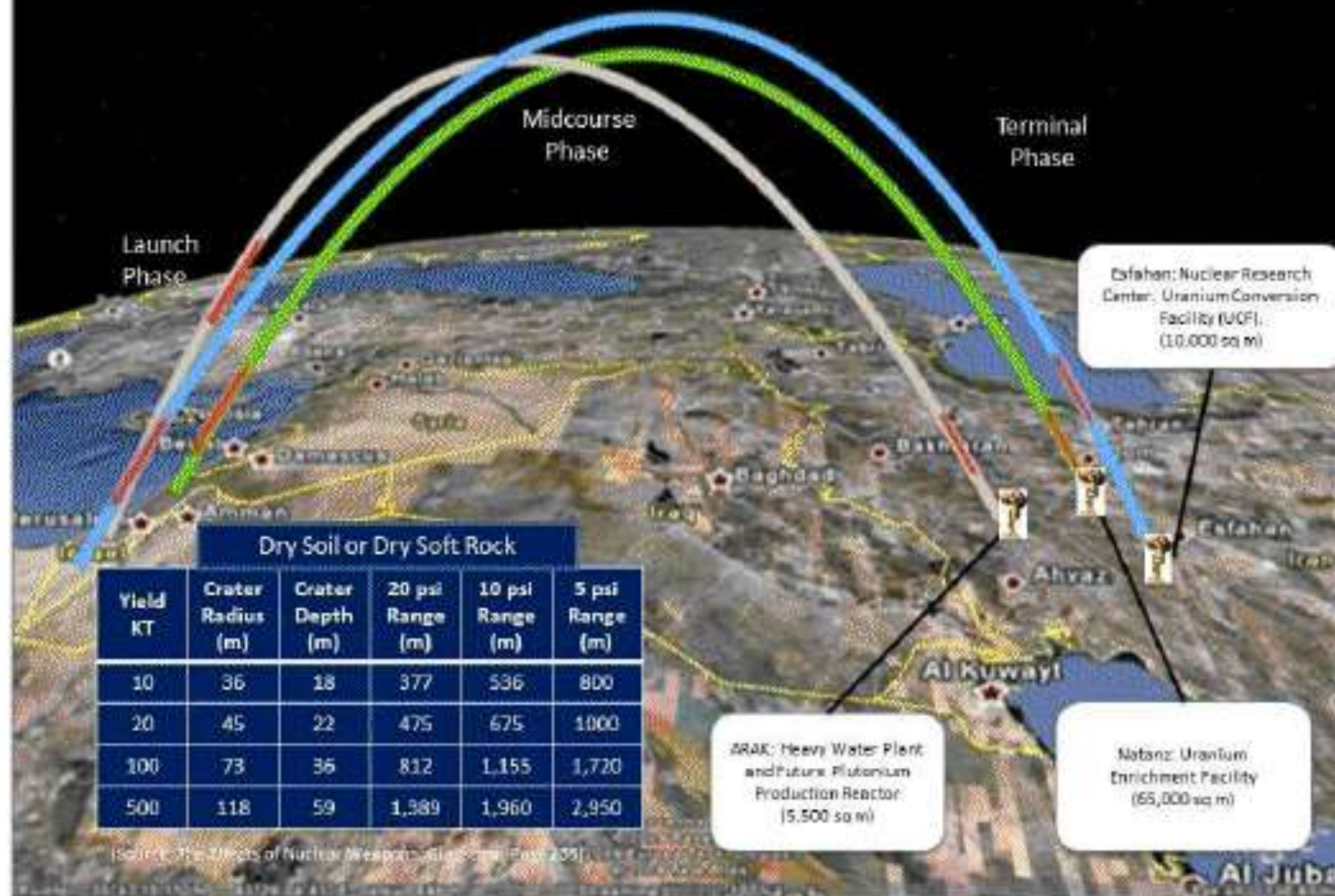
## Razed Test Site (?) At Parchin



Source: ISIS and CNN, <http://security.blogs.cnn.com/2012/05/30/cleanup-at-irans-parchin-site/>



## Low – Yield Israeli Nuclear Strike on Iran's Nuclear Facilities





## Nuclear Capability and Risk

Tehran: 1 Megaton



Population: 8.3 million urban, 14 million wider area

Urban: 730 km<sup>2</sup> (280 sq mi)

Wider Area: 1,274 km<sup>2</sup> (492 sq mi)

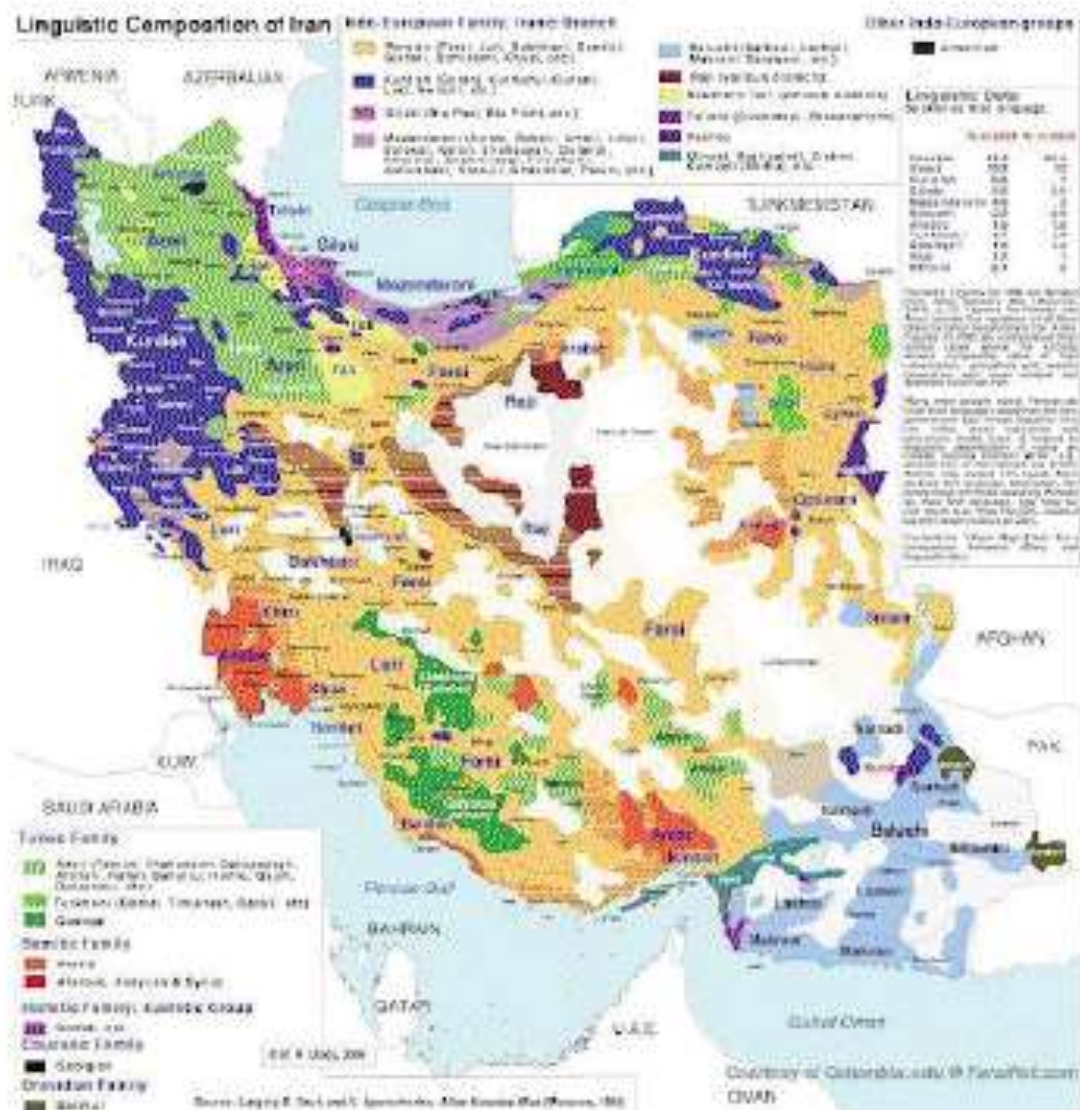
Tel Aviv: 20 Kilotons



Population: 410,000+

Area: 52 km<sup>2</sup> (20 sq mi)

### Iran's Ethnic Vulnerability to Nuclear Strikes



Source: Farsi – Persian Language, Farsi – Persian Language, <http://www.farsinet.com/Farsi/>

## Iranian Counter Vulnerabilities:

- Highly populated, state dominated, corrupt economy with high military spending and major state interference.
- Halting all oil exports critical to Iran. EIA reports that,
  - Pre-sanctions, Iran exported approximately 2.2 million bbl/d of crude oil. Iranian Heavy Crude Oil is Iran's largest crude export followed by Iranian Light. In 2011, Iran's net oil export revenues amounted to approximately \$95 billion. Oil exports provide half of Iran's government revenues, while crude oil and its derivatives account for nearly 80 percent of Iran's total exports.
  - Kharg Island, the site of the vast majority of Iran's exports, has a crude storage capacity of 20.2 million barrels of oil and a loading capacity of 5 million bbl/d. Lavan Island is the second-largest terminal with capacity to store 5 million barrels and loading capacity of 200,000 bbl/d. Other important terminals include Kish Island, Abadan, Bandar Mahshar, and Neka (which helps facilitate imports from the Caspian region).
  - Iran is the second-largest oil consuming country in the Middle East, second only to Saudi Arabia. Iranian domestic oil demand is mainly for diesel and gasoline. Total oil consumption was approximately 1.8 million bbl/d in 2010, about 10 percent higher than the year before. Iran has limited refinery capacity for the production of light fuels, and consequently imports a sizeable share of its gasoline supply (Imports 300,000 bbbl of gasoline per day.). Iran's total refinery capacity in January 2011 was about 1.5 million bbl/d, with its nine refineries operated by the National Iranian Oil Refining and Distribution Company (NIORDC), a NIOC subsidiary.
- Refineries and gas distribution critical to economy. Are highly vulnerable.
  - Natural gas accounts for 54 percent of Iran's total domestic energy consumption.
- Key aspects of transportation and power grid are highly vulnerable. Today's precision strike assets allow to know out key, repairable links or create long term incapacity. They have become "weapons of mass effectiveness."
  - EIA reports Some power plants are running as low as 10 percent of their nameplate capacity as Iran's electricity infrastructure is largely in a state of dilapidation and rolling blackouts become endemic in summer months. The amount of generation lost in distribution is a central indicator of the disrepair of the electricity network, with upwards of 19 percent of total generation lost during transmission.
- Limited and vulnerable air defenses with only one modern and very short-range air and cruise missile defense system. Will remain vulnerable to stealth, cruise missiles, and corridor suppression of enemy air defenses unless can get fully modern mix of radars, C4I/BM assets, and S-300/400 equivalent.
- Needs imports of food and product.
- Rail system vulnerable. Can use smart mines on all ports.
- Naval embargo presents issues in maritime law, but can halt all Iranian traffic, "inspect" all incoming shipping.
- "No fly zone" would affect operations, especially if include helicopters. Warning could affect civil aviation.

Source: See <http://www.eia.gov/countries/cab.cfm?tips=IR> & cabs/OPEC\_Revenues/Factsheet.html for energy data.

# ***US Preventive Strikes***

## **Key Issues**

- **Trade-off with containment, extended deterrence**
- **GCC and allied Support for initial and sustained operations.**
- **Key nuclear targets or nuclear-missile suppression**
- **Intel, targeting, actual damage, BDA limits.**
- **Penetration and survivability, Stealth (B-2, F-22, F-35, ALPW, cruise, UCAV), EW, SEAD, corridor blasting, lasting suppression.**
- **Real world impact of cruise missiles, earth penetrators, precision systems.**
- **Ability to restrike and sustain suppressive restrike aftermath.**
- **Collateral damage. Cost to Iranian civilians.**
- **Iranian reaction and counterstrikes, escalation, commitment to seeking nuclear weapons.**
  - **Missile threat vs. suppression and missile defense.**
  - **Impact on allied states and global economy.**
- **Global political reactions.**

## **Illustrative US Strike Mission**

- **B-2 bombers out of Diego Garcia, each carrying 2 GBU-57 MOP bombs.**
- **Mission can be achieved with a high success rate also maintaining a sustained strike over a couple of days.**
- **B-2 bombers escorted by F-18s from the 5<sup>th</sup> fleet stationed in the Gulf area, or F-15Es and F-16Cs from forward area air bases.**
- **United States and Western allies considered to be the only countries involved, no GCC or any Arab country involvement and especially no-Israeli direct involvement.**
- **Still though, Iran most probably will accuse Israel to be part of the Strike and will try to retaliate, either by launching a Ballistic Missile on Israel carrying conventional or WMD (chemical, biological, radiological) and activating Hezbollah to launch cross border attacks against Israel.**
- **Iran would also try to attack any U.S. military airbases that are active in the Gulf even if they are stationed in GCC countries.**
- **If Iran attacks any of the GCC countries, then they will have the right to self-defense. In addition the whole Arab Middle East will not accept an Iranian attack on any of the GCC countries.**

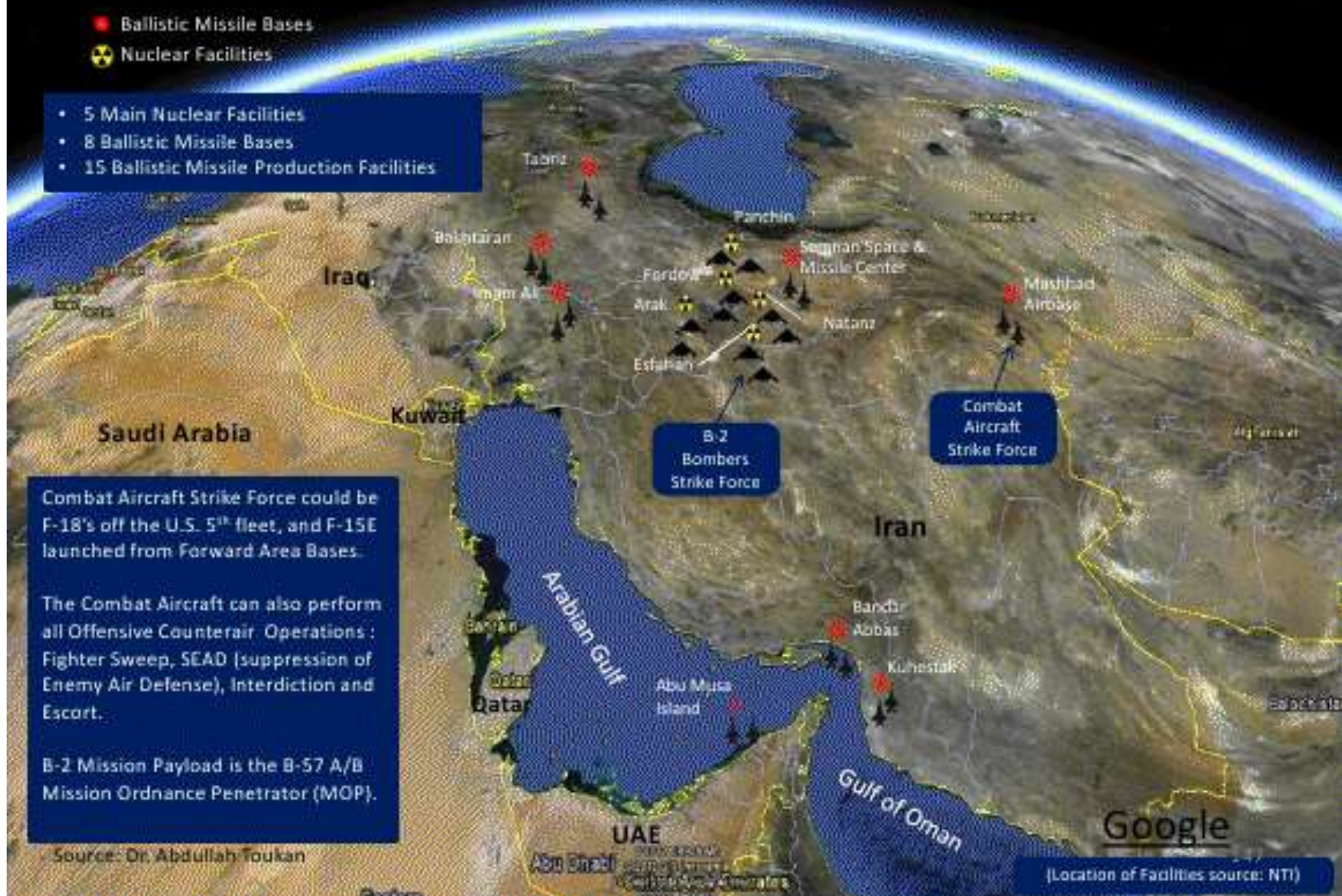


# US Preventive Military Strike against Iranian Nuclear Facilities and Ballistic Missile Bases

● Ballistic Missile Bases

⚡ Nuclear Facilities

- 5 Main Nuclear Facilities
- 8 Ballistic Missile Bases
- 15 Ballistic Missile Production Facilities



Combat Aircraft Strike Force could be F-18's off the U.S. 5<sup>th</sup> fleet, and F-15E launched from Forward Area Bases.

The Combat Aircraft can also perform all Offensive Counterair Operations : Fighter Sweep, SEAD (suppression of Enemy Air Defense), Interdiction and Escort.

B-2 Mission Payload is the B-57 A/B Mission Ordnance Penetrator (MOP).

Source: Dr. Abdullah Toukan

(Location of Facilities source: NTI)

## **The New York Times, March 19, 2012: “U.S. War Games Sees Perils of Israeli Strike Against Iran”**

- **A classified war simulation held this month to assess the repercussions of an Israeli attack on Iran forecasts that the strike would lead to a wider regional war, which could draw in the United States and leave hundreds of Americans dead, according to American officials.**
- **The officials said the so-called war game was not designed as a rehearsal for American military action — and they emphasized that the exercise’s results were not the only possible outcome of a real-world conflict.**
- **But the game has raised fears among top American planners that it may be impossible to preclude American involvement in any escalating confrontation with Iran, the officials said. In the debate among policy makers over the consequences of any Israeli attack, that reaction may give stronger voice to those in the White House, Pentagon and intelligence community who have warned that a strike could prove perilous for the United States.**
- **The results of the war game were particularly troubling to Gen. James N. Mattis, who commands all American forces in the Middle East, Persian Gulf and Southwest Asia, according to officials who either participated in the Central Command exercise or who were briefed on the results and spoke on condition of anonymity because of its classified nature. When the exercise had concluded earlier this month, according to the officials, General Mattis told aides that an Israeli first strike would be likely to have dire consequences across the region and for United States forces there.**
- **The two-week war game, called Internal Look, played out a narrative in which the United States found it was pulled into the conflict after Iranian missiles struck a Navy warship in the Persian Gulf, killing about 200 Americans, according to officials with knowledge of the exercise. The United States then retaliated by carrying out its own strikes on Iranian nuclear facilities.**

- The initial Israeli attack was assessed to have set back the Iranian nuclear program by roughly a year, and the subsequent American strikes did not slow the Iranian nuclear program by more than an additional two years. However, other Pentagon planners have said that America's arsenal of long-range bombers, refueling aircraft and precision missiles could do far more damage to the Iranian nuclear program — if President Obama were to decide on a full-scale retaliation.
- The exercise was designed specifically to test internal military communications and coordination among battle staffs in the Pentagon; in Tampa, Fla., where the headquarters of the Central Command is located; and in the Persian Gulf in the aftermath of an Israeli strike. But the exercise was written to assess a pressing, potential, real-world situation. In the end, the war game reinforced to military officials the unpredictable and uncontrollable nature of a strike by Israel, and a counterstrike by Iran, the officials said.
- American and Israeli intelligence services broadly agree on the progress Iran has made to enrich uranium. But they disagree on how much time there would be to prevent Iran from building a weapon if leaders in Tehran decided to go ahead with one.
- With the Israelis saying publicly that the window to prevent Iran from building a nuclear bomb is closing, American officials see an Israeli attack on Iran within the next year as a possibility. They have said privately that they believe that Israel would probably give the United States little or no warning should Israeli officials make the decision to strike Iranian nuclear sites.
- Officials said that, under the chain of events in the war game, Iran believed that Israel and the United States were partners in any strike against Iranian nuclear sites and therefore considered American military forces in the Persian Gulf as complicit in the attack. Iranian jets chased Israeli warplanes after the attack, and Iranians launched missiles at an American warship in the Persian Gulf, viewed as an act of war that allowed an American retaliation.

## The B-2 Bomber



Primary Function	Multi role heavy bomber
Engines:	Four GE F-118-GE-100 engines, each with a thrust of 17,300 pounds (7,847 kg)
Speed, Cruise:	High subsonic
Ceiling:	50,000 ft (15,000 meters)
Weight Takeoff, (typical):	335,500 – 350,000 pounds (152,600 – 159,000 kg)
Weight, Empty (typical):	125,000 – 160,000 pounds
Range:	6,000 nmi (9,600 km), unrefueled range for a Hi-Lo-Hi mission with 16 B61 nuclear free-fall bombs 10,000 miles with one aerial refueling.
Payload:	40,000 pounds (18,000 kg)
Crew:	Two pilots
Current Armament:	<b>Nuclear:</b> 16 B61, 16 B83 <b>Conventional:</b> 80 MK82 (500lb), 16 MK84 (2000lb), 34-36 CBU-87, 34-36 CBU-89, 34-36 CBU-97 <b>Precision:</b> 216 GBU-39 SDB (250 lb), 80 GBU-30 JDAM (500 lb), 16 GBU-32 JDAM (2000 lb), GBU-27, GBU-28, GBU-36, GBU-37, AGM-154 HSW, 8-16 AGM-137 TSSAM, 2 MOP / DSHTW/ Big BLU



- In July 2009, verification of equipment required to integrate the MOP on the B-2 was complete - the hardware that holds the MOP inside the weapons bay. The MOP is a GPS-guided weapon containing more than 5,300 pounds of conventional explosives inside a 20.5 ft long bomb body of hardened steel. It is designed to penetrate dirt, rock and reinforced concrete to reach enemy bunker or tunnel installations. The B-2 will be capable of carrying two MOPs, one in each weapons bay.

- The B-2 currently carries up to 40,000 pounds of conventional ordnance. For example, it can deliver 80 independently targeted 500-lb class bombs from its smart bomb rack assembly; or up to 16 2,000-lb class weapons from its rotary launcher. Integration of the MOP on the B-2 is the latest in a series of modernization programs that Northrop Grumman and its subcontractors have undertaken with the Air Force to ensure that the aircraft remains fully capable against evolving threats.

GBU-57A/B Massive Ordnance Penetrator (MOP)	Specifications
Weight, total	13,600 kg (slightly less than 30,000 pounds)
Weight, explosive	2,700 kg (6,000 lb)
Length	6m / 20.5 feet
Diameter	31.5 in diameter
Control	Short-span wings and trellis-type tail
Penetration	60 meters (200ft) through 5,000 psi reinforced concrete 40 meters (125 ft) through moderately hard rock 8 meters (25 feet) through 10,000 psi reinforced concrete
Contractors	Boeing, Northrop Grumman
Platforms	B-52, B2
Guidance	GPS aided Inertial Navigation System

**Priority Targets in addition to Iran's Main Nuclear Facilities**  
**Ballistic Missiles Facilities**

<b>Missile Base</b>	<b>Missile Production Facility</b>
Bakhtaran Missile Base	Fajr Industrial group
Abu Musa Island	Gostaresh Scientific Research Center
Bandar Abbas	Iran Aircraft Manufacturing Industries
Imam Ali Missile Base	Isfahan Missile Complex
Kuhestak Missile battery	Karaj Missile Development Complex
Mashad Airbase	Lavizan Technical and Engineering Complex
Semnan Space and Missile Center	Parchin Chemical Industries
Tabriz Missile Base	Qods Aeronautics Industries
	Semnan Missile Complex
	Shahid Bakeri Industrial Group
	Shiraz Missile Plant
	Sirjan Missile Plant



## U.S. Military Strike Force Allocation against Iran's Nuclear and Ballistic Facilities Offensive Counterair (OCA) Mission

### Performance Criteria and Mission Parameters:

- A damage performance criteria above 75% for each target, nuclear and missile, resulting in a delay of at least 5 to 10 years in Iran's Nuclear Program, and substantially weakening Iran's ballistic missile retaliatory capability.
- Two aircraft are allocated to each target to maximize the damage on First Strike.
- Destroying the maximum number of Missile Bases, Mobile Launchers and Production Facilities during (boost Phase) or before Launch, thereby reducing the number of incoming missiles (warheads) and also reducing the number of shots defense needs to take at each Incoming warhead.

Iran Target	Number of Targets	Aircraft Allocated
Main Nuclear	5 Facilities	2 A/C per target resulting in 10 B-2 Bombers
Missiles Bases	8 Bases	2 A/C per base resulting in 16 Strike A/C
Missile Production	15 Facilities	2 A/C per target resulting in 30 Strike A/C
Mobile Missile Launchers	Assuming 22 Launchers in various locations	2 A/C per mobile launcher resulting in 44 A/C
TOTAL	50	10 B-2 Bombers 90 Strike Aircraft = 100

## **Additional requirements to increase Mission Effectiveness**

The effectiveness of OCA operations depends on the availability of certain resources. System capabilities are influenced by the situation, threats, weather, and available intelligence. The following are some of the resources used to conduct OCA:

### **Aircraft:**

Fighter and bomber aircraft provide the bulk of the weapon systems for OCA operations. Other types of aircraft and weapon systems are often critical enablers of counterair operations (e.g., electronic attack, electronic protection, and air refueling aircraft).

### **Missiles:**

These weapons include surface-to-surface, air-to-surface, and air-to-air missiles, as well as air-, land-, and sea-launched cruise missiles. Many of these weapons have long ranges and some have very quick reaction times. These weapon systems can eliminate or reduce the risk of harm to friendly forces by destroying enemy systems in the air and on the ground.

### **ISR Systems:**

ISR systems and resources may be used in counterair operations to provide intelligence, surveillance, reconnaissance, deception, and other effects against enemy forces and air defense systems. These activities include the use of airborne, space-borne, and ground (e.g., human intelligence) assets.

### **Unmanned Aircraft Systems (UAS):**

**UAS may be used in counterair operations to provide ISR, deception, jamming, harassment, or destruction of enemy forces and air defense systems. These systems may be preprogrammed or remotely piloted. They provide valuable intelligence to friendly forces and may now be used to attack some targets either too dangerous or risky for manned aircraft or where manned aircraft are not present or available to respond. They may also be used to help provide persistent air presence over enemy forces in situations where this may have important psychological effects upon an adversary (as part of OCA or other operations) if synergistically tasked to help provide persistent presence over adversary forces.**

### **Special Operations Forces (SOF):**

**SOF can conduct direct action missions, special reconnaissance, and provide terminal guidance for attacks against valuable enemy targets. Planners in the AOC coordinate with the special operations liaison element to coordinate the use of special operations assets in support of the counterair mission.**

### **C2 Systems:**

**These systems enhance OCA operations by providing early warning, intelligence, identification, and targeting data, as well as C2 of friendly forces.**

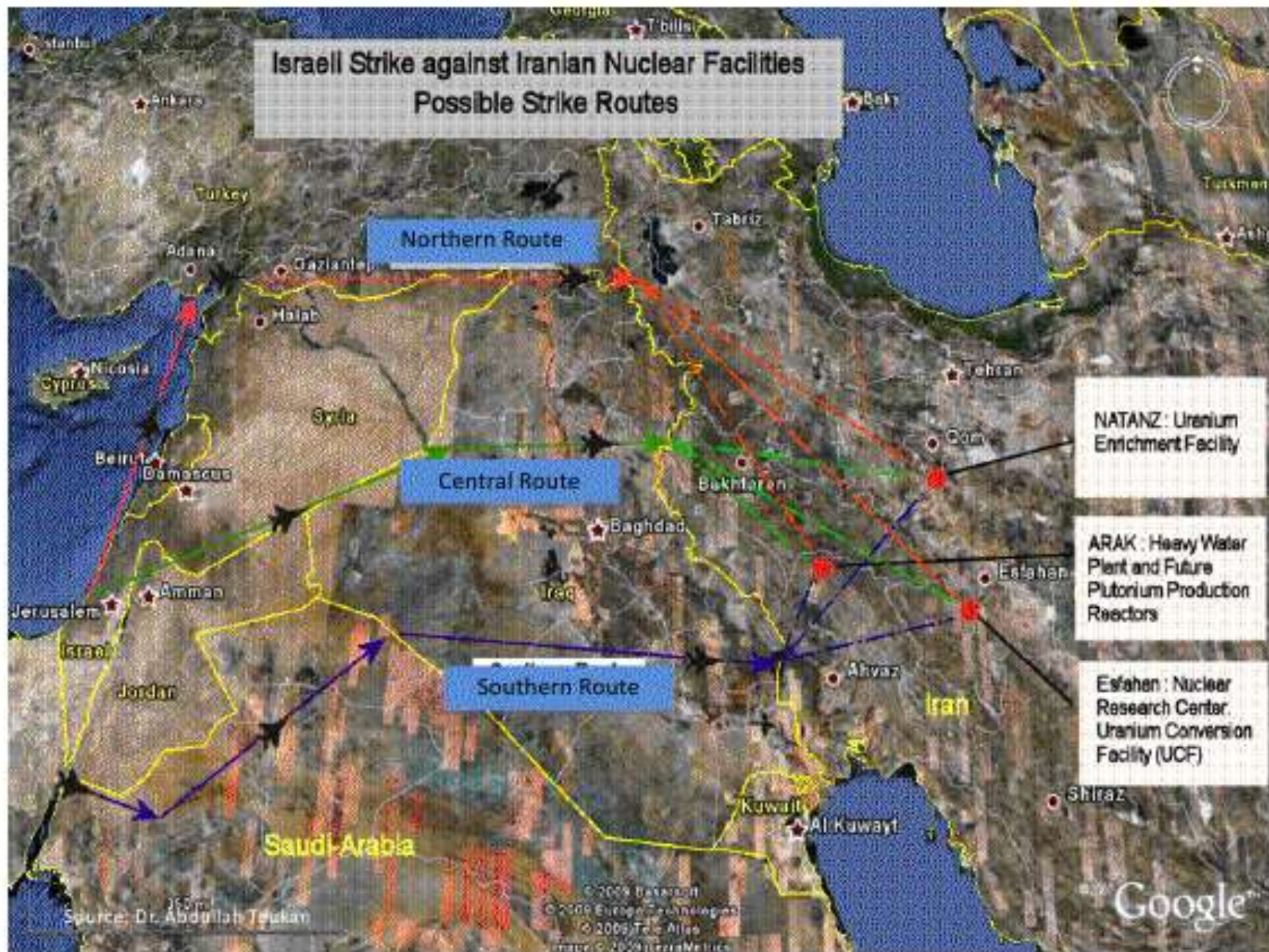
# ***Israeli Preventive Strikes***

## **Key Issues**

- **Estimate of damage can in inflict and Iranian ability to recover.**
- **Real world Israeli perceptions of intelligence, targeting capability, battle damage, strike capability, and losses.**
- **Estimate of impact on US support, potential impact as “trigger force.”**
- **Estimate of arms control negotiations, US willingness to conduct preventive strikes, US-GCC containment, US extended deterrence options.**
- **Israel views of Iran risk tolerance, extent to which Israel vs. Iran’s neighbors is real rationale for Iranian build up.**
- **Value in letting Iran commit resources to maximum before striking.**
- **Assessment of US, Arab, Turkish, international political reactions.**
- **Assessment of near, mid, and long-term Iranian reactions.**
- **Assessment of impact of Iranian nuclear weapons on Israeli-Iranian nuclear arms race, regional, proliferation.**

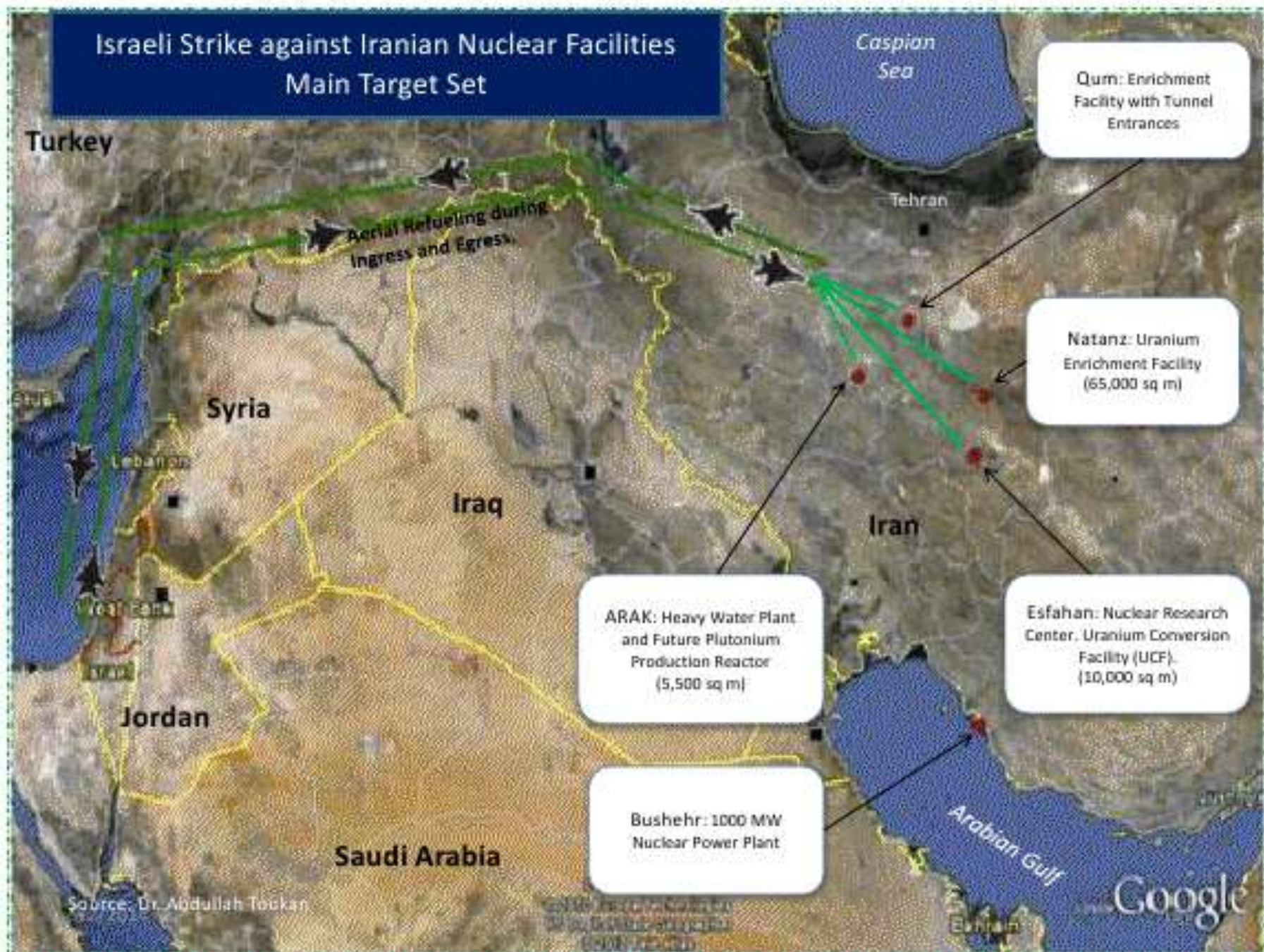


## Israeli Strike against Iranian Nuclear Facilities Possible Strike Routes





## Israeli Strike against Iranian Nuclear Facilities Main Target Set

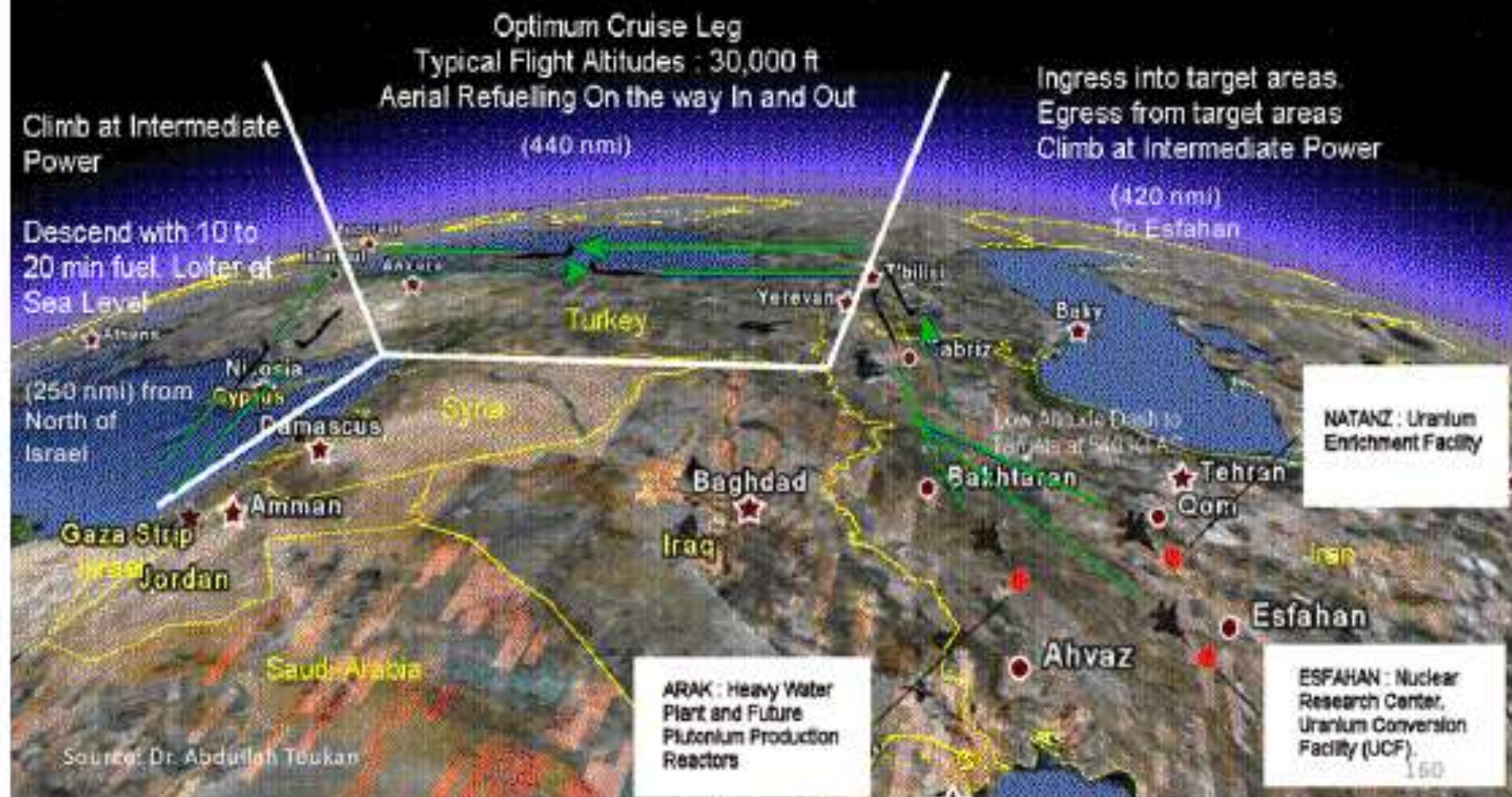




# Israeli Strike against Iranian Nuclear Facilities

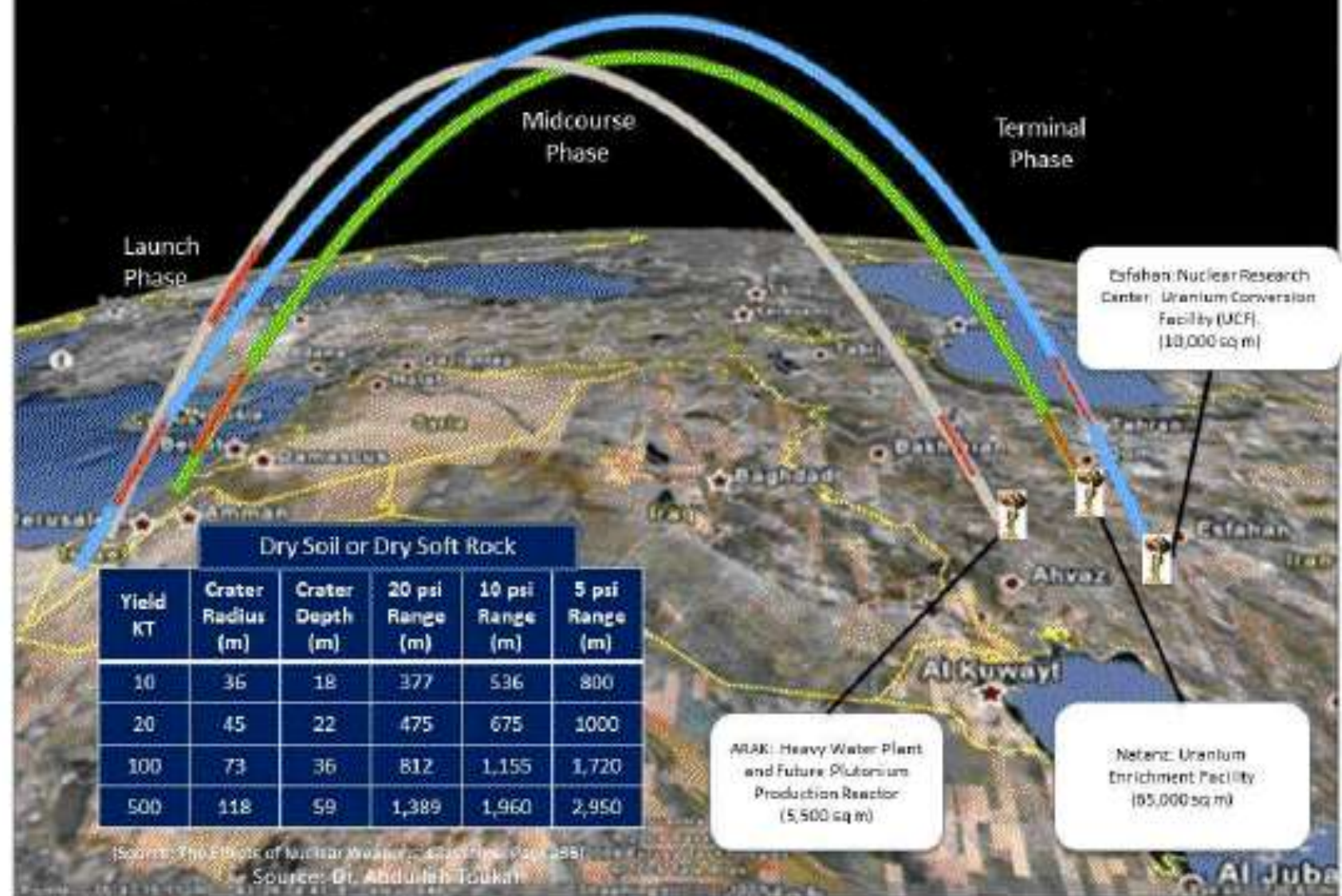
## Air To Ground Mission Profile

### Hi-Lo-Lo-Hi





## Low – Yield Israeli Nuclear Strike on Iran's Nuclear Facilities



## Low Yield Earth Penetrating Nuclear Weapons

- Another scenario is using these warheads as a substitute for conventional weapons to attack deeply buried nuclear facilities in Iran. Some believe that nuclear weapons are the only weapons that can destroy targets deep underground or in tunnels.
- The gun-type Uranium based nuclear bomb dropped on Hiroshima by the U.S. in August of 1945 was about 8,000 pounds in weight, and contained about 60 kg of weapons grade Highly Enriched Uranium (HEU), of which about 0.7 kg underwent fission producing a Yield of 12.5 kilotons. The Plutonium implosion bomb dropped on Nagasaki weighed about 10,800 pounds and contained about 6.4 kg of weapons-grade Plutonium PU-239. Producing a yield of 22 kilotons. in the subsequent years the U.S. was able to produce Plutonium-implosion nuclear bombs in the same yield range with weights down to 2,000 lbs and less.
- If Ballistic Missiles are used to carry out the mission, Israel has have a Ballistic Missile Defense System whereas Iran does not have one, such as the Russian S-300PMU2 "Favorit", that was designed to intercept ballistic missiles as well as combat aircraft.

# ***Gulf Military Balance Back Up***



