



## Tactics and Strategy at the Strait of Hormuz

Posted by [Luis de Sousa](#) on March 6, 2012 - 12:15am

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[Afonso de Albuquerque](#) arrived at the Indian Ocean in 1506, commanding a squadron of five war vessels integrated in Tristão da Cunha's Armada. In the summer of 1507, after the conquest of Socotra, the Armada's main objective, Afonso de Albuquerque departed on his own, commanding a fleet of six vessels and 500 marines to take the easternmost island at the entrance of the Persian Gulf, called by local folk Hormuz. Defeating a garrison of 15 000 men with his artillery, Albuquerque took Hormuz and commissioned the construction of a fortress. This island would eventually lend its name to one of the most important choke-points of the Indian Ocean, at the time the principal commercial pathway of commodities from Asia to Europe. Afonso de Albuquerque had brought with him from Lisbon a sealed letter appointing him as



Vice-King to the East Indies, replacing Francisco de Almeida, whose strict naval prowess policy didn't impress the territory-hungry King. A period of indecision ensued, with most naval officers in the region initially refusing Albuquerque's rule and Hormuz was lost. In 1515, in his final days as Vice-King, Afonso de Albuquerque stormed Hormuz once again, taking it for good without military resistance. The fortress that stands to this day was finally completed, sealing the command over the commerce in the region. Beyond fortresses, the Portuguese left another lasting mark of their presence in Persia, which is the name of the currency, the rial.

After the Portuguese came the Persians, and then the English. The importance of the fortress waned, but that of the Strait of Hormuz itself, if anything, has only increased. Commodities flow in the opposite way these days, but unlike the luxury and exoticism of the past, today these are vital inputs to the world economy.

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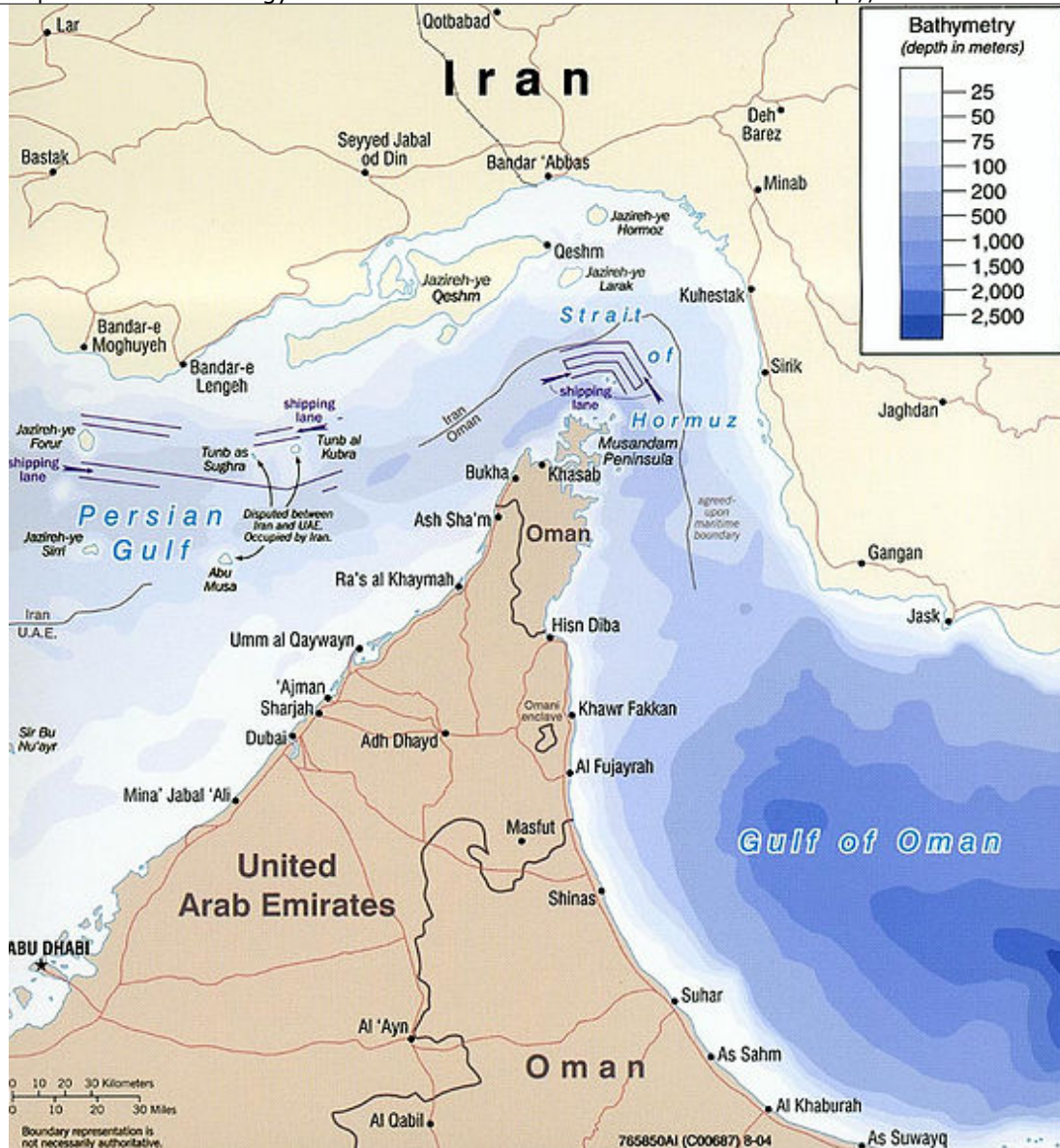
## Introduction

About a month ago, when Iranian officials started venting the idea of closing the Strait of Hormuz to commercial traffic, Western media was prompt in reviewing the events of 1981. At that time, Iranian forces mined the Strait and engaged commercial vessels with rubber speedboats in what was largely seen as a pathetic attempt to control the area. The media seems to think that Iranian officials are talking about using similar tactics today. In reality, the military technology deployed by Iran in the region is completely different today, creating a strategic scenario totally different from that of 30 years ago.

According to the EIA, [17 million barrels of petroleum](#) crossed the Strait of Hormuz each day

during 2011. This makes up almost 40% of the international petroleum market, clearly the most important choke-point of the world for this commodity; on average 28 oil tankers cross the Strait every day, half of them empty and inbound, the other half outbound. Adding to petroleum is liquified natural gas (LNG), exported by Qatar and the UAE ; [over 6 million tones of LNG](#) cross the Strait every month, about 25% of the international market. All of this traffic takes place very close to Iranian waters and shores.

Iran is a very large country, with an area of almost 1 700 000 km<sup>2</sup>, more than Spain, France, Italy, and Germany combined. To its south, Iran has a coast almost 1700 km long, which makes up all the north shores of the Persian Gulf (hence the name) and the Gulf of Oman. Along this coast lie numerous islands of assorted sizes, including Levan, Hendorabi, Kish, Forur, Sirri, Abu Masa, the Tunb twins, Qeshm, Hengrn, Lark, and of course, Hormuz. All these islands are found west of the Strait, Hormuz being effectively the eastern most of them all. Qeshm is by far the largest of these islands, with 1490 km<sup>2</sup>, larger than all the other islands together. Contrary to what its name suggests, the narrowest section of the Strait is along the southeastern shores of Qeshm, between the smaller islands of Hengrn and Lark. Between Lark and the smaller isles of Oman, there are less than 40 km of water. Sovereignty over the Strait waters is divided by Iran and Oman. The northern half is shallower and less suitable for large vessel navigation. Being deeper, the Omani half provides for the narrow naval corridors that make up what has been for centuries one of the world's most important commercial routes.



*The Strait of Hormuz. Source: [Wikipedia](#).*

This post tries to portray the economic and military chessboard around the Strait of Hormuz today. In the first section, I try to gather the main characteristics of Iran's economy and how it may be impacted by the sanctions being imposed today; a second section dives into the military technology Iran has to act upon the Strait; and in a third section I'll draw several hypothetical strategic scenarios that may develop in the region.

## Part I – Iran's Economy

In this section I'll look into Iran's economy and try to understand the possible consequences of the [sanctions imposed recently by the US](#), and to be [followed shortly by the EU](#). This analysis doesn't pretend to be in any way a thorough account of Iran's socio-economic fabric, but simply a collection of points that are relevant in the present crisis. The data presented here were collected mostly from [Wikipedia](#) and the [World Factbook](#).

First of all, it is important to situate Iran in the world economic map. The country has a population of 78 million, and in 2010 its GDP increased to 400 G\$. This puts Iran into the top 30 economies of the world, although in terms of GDP per capita, with a nominal figure of 6 250



\$/cap/a, it is within the middle of world rank, on par with countries like Serbia and Belarus; though well ahead of China, for instance. Using purchasing power parity figures, Iran looks quite different; with some 12 000 PPP GDP/cap/a, it figures ahead of Brasil and not far from European states like Romania or Bulgaria. An important aspect about Iran is that unlike most of its oil exporting neighbours, it seems to have almost finished its population transition, with the growth rate slowly but steadily in decline since the 1980s; presently at 1.1 %/a.

Data from [World Bank](#) - Powered by [Google](#)

*Iran's population growth rate. Source: [Google](#).*

Iran is a hybrid economy, with half of it spread over a diversified portfolio of private enterprises, and the other half subject to centralized planning. The country is presently in the middle of a very ambitious five-year plan ending in 2015. This plan aims at two large goals: to become self sufficient, and to shift the focus of exports from petroleum to industrial goods and gas. This includes investment in ore mining and an increase of steel and cement production; the petrochemical industry should double in size and the rail network largely expand. The famous energy subsidies (more ahead) are to be completely phased out, in order to force a competitive hike of local industries. Iranian leaders have a big vision for their country: a modernized industrial economy that transforms abundant energy into value-added goods for export.

The analysis of Iran's budget is quite difficult, given the contradictory data available. The World Factbook figures are 110 G\$ for revenues (27% of GDP) and 90 G\$ for expenses (22% of GDP); in Wikipedia the revenue figure is put at 500 G\$, which would come at 125% of GDP. Also from Wikipedia, it can be learnt that revenues from oil exports stand at about 60 \$/b, multiplying this by 2.2 Mb/d and 365 days it amounts to 50 G\$ for the yearly oil revenue; a plausible figure that's 45% of the budget revenue and 55% of expenses. Gas itself doesn't seem to contribute in any relevant way to the budget, though internal consumption is about 75% of production; what happens to the remaining 25%, I couldn't determine. But the most intriguing aspect about Iran's budget is the energy subsidies. Wikipedia quotes [a dead link to Iran Daily](#) that claims that this figure was 84 G\$ in 2008, including oil products, gas and electricity, implying that over 90% of expenses are used for this purpose (this could be referring to lost revenue instead, but even then it would be too high).

Looking at the trade balance, Iran runs an yearly surplus of 28 G\$, about 7% of GDP. Exports in 2010 were worth around 84 G\$, of which 80% was crude petroleum and 4% petrochemicals. The

largest buyers of these goods were China (16%), India (13%), and Japan (12%), in what seems to be a fairly wide portfolio of export partners. Imports in 2010 amounted to 59 G\$, of which about half were industrial raw materials and a third capital goods. The largest sources of these goods by a good margin were the UAE and China, with 15% each; again, the portfolio of import partners is quite wide, with certain European states showing some relevance, especially Germany (10%) and Italy (5%). Beyond the countries mentioned, Iran also has important commercial relations with South Korea, both on imports and exports. A contradictory account was [given days ago by the Tehran Times](#), claiming that the non-oil trade balance will be at zero next year. This latter claim would imply an expansion of non-oil exports close to 70 G\$, from 17 G\$ in 2010.

Although Wikipaedia presents a round figure of 100 G\$ for the total foreign currency reserves held by Iran, the World Factbook presents a relatively lower figure - 75 G\$ at the end of 2010, and a declining trend from over 80 G\$ in 2008. This is one of the important points where the information available is diverse, though the declining trend helps explaining the rapid devaluation of the rial since last summer.

As stated above, Iran consumes most of the gas it produces, primarily to generate electricity in relatively inefficient thermal plants. The 2010 – 2015 economic plan obviously intends to change this with the development of a nuclear park, freeing this gas for export. Adding to this is a rapid expansion of production in the South Pars field, by which Iran intends to multiply by five its oil and gas revenues, to 250 G\$/year in 2015. Undoubtedly an ambitious figure, especially considering that sovereignty over parts of this mammoth field is still in dispute, especially in the border with Kuwait.

In another important sector, that of agriculture, Iran appears quite healthy. Long term programming since the 1979 revolution has slowly fostered an increase in the country's food output, underpinned by a shift from subsistence to industrial agriculture and the construction of dams that widened the irrigated area. Today Iran produces about 90% of the foodstuff it consumes and has recently become a net exporter of wheat. It imports mostly rice, and since its exports (fruits, nuts, animal hides, spices) are more valuable, it could even be running an agricultural trade surplus, though I haven't found hard data to confirm this.

As a final relevant characteristic, I'd like to point to Iran's parallel economy, which accounts for 30% of the foreign trade, according to Wikipaedia. This implies huge revenues missed every year by the government, but more than that, points to corruption mechanisms deeply installed in state institutions. At this distance, and without hard data, I'll avoid diving further into this subject, though this may have an important impact on the final outcome of Iran's present economic plan.

## Sanctions impact

Up to this point the most visible consequence of the tensions with NATO around the nuclear programme has been the devaluation of the national currency, the rial. The currency underwent a steady decline in 2011 that has accelerated since August; so far it has lost half of its value. Investors and common folk flocked to foreign currency and gold, even exchanging hard assets for liquidity. Between August and December, the Central Bank of Iran (CBI) alone sold 40 tons of gold. In the weeks before Christmas, when the US Congress approved the new batch of sanctions, the CBI apparently lost the ability to supply US dollars, likely due to a stock rupture of greenback bills. A bank run ensued, and in the days before Christmas folk piled in to the CBI branches in Tehran to exchange their money for gold. In three days, five tons of gold were sold and the price of this metal at independent exchange offices clearly exceeded the values in international markets. The Iranian government was very close to losing control during this time, something largely missed by the western media. I found this information [well documented on a metals](#)

[exchange forum](#), that in the meantime has mysteriously been removed from the public domain. The CBI stopped selling cash gold on 23 December, possibly due to a coin stock rupture, and now only offers four months futures contracts. Soon after, the government outlawed the exchange of rials for foreign currencies or gold.

The driver behind this devaluation of the rial is the perceived impact on the state's budget, with a decline in revenues from oil exports. In fact, the amount of oil Iran presently exports to non aligned countries is not that large. A rough estimate points to 500 kb/d to China and India combined, while the remainder is relatively scattered. Especially if Korea and Japan join the US and the EU in these sanctions, it could become effectively impossible for Iran to export most of its surplus oil, even temporarily. Government spending will certainly come under strain, affecting investments and likely the famous subsidies. Given the amount of foreign currency reserves it holds, Iran should in theory be able to sustain a *de facto* budget deficit for some time. But it is the vision of the erosion of the budget that is undermining the rial, as investors do not believe present leaders and/or institutions will be able to deal with this crisis and avoid the eventual exhaustion of foreign currency. Imports are also at stake, with scattered news reporting consequences for other sectors of the economy; as an example, Iranian airplanes have recently been having [difficulties in getting refueled abroad](#). Nevertheless, given Iran's relative independence in certain sectors, daily life might not be subject to major constraints (i.e. empty shelves), provided the rial is brought under control.

In the longer term, these sanctions have another outcome: the impairment of the present economic plan. More than investment, the transformation of Iran into an industrial economy will certainly require the OECD markets to export the resulting products - in the first place, gas. The import of certain technologies and industrial goods only available from the West will also be affected, further impacting the modernization plan. Even if healthy commercial relations with other Asian nations survive, those are for the most part economies going through a similar process of industrial modernization, and in all likelihood will not be receptive to the same sort of products they export themselves. In essence Iran may endure but cannot permanently afford these sorts of sanctions, as they create a state in which Iranian institutions are forced to take serious measures.

## Part II – Iran's tactical options around the Strait of Hormuz

In this part I'll go through several technologies that seem relevant in the military chessboard of the region; though somewhat long, this list isn't exhaustive. I've no access to military intelligence, hence consider this a picture with many blanks to fill. Besides that, it is important to note that the weapons industry today uses many of the marketing tactics used by civilian industries, so the information they release to the public should never be taken as complete or totally accurate. And finally, many of the weapons here described were never used in combat (and I hope they never will), which only adds to the uncertainty of the information appearing in the public domain.

### II.I Anti-Ship Missiles

The most important weapons Iran has in the region are its anti-ship missiles, a plethora of technologies that allow for remote targeting of sea vessels without much exposure. The following paragraphs run down from smaller to largest.

#### [C-701](#) and derivatives

These are small air to surface missiles developed in China to target small vessels, with less than 200 tones displacement. They are subsonic and have a short operational range, no more than 20

km, but its low flight altitude, less than 20 meters, and the continuous development of its guiding system guarantee a high rate of accuracy, over 95%. China seems to produce a special version with an upgraded guidance system of this missile for the external market called [C-703](#). Iran itself produces internally another version developed to be launched from ground vehicles (and possibly sea vessels), called the [Kowsar](#). With further upgrades to its guidance system, Iranian officials have claimed it can resist electronic interference. Due to its short range, this family of missiles need some sort of exposure to be deployed outside Iran's borders; even in the Strait, they must be either fired from the air or from small sea vessels. This requires some degree of air supremacy for a sustainable usage during a military conflict.

A Kowsar was likely the weapon used by the Hezbollah to hit the [INS Hanit](#), ten nautical miles (18 km) off Beirut in 2006. The Israeli corvette (over 1000 tons displacement) was severely damaged but remained afloat: with propulsion systems partially functioning, it was able to retreat to safety and head back to Israel for repairs. A controversial aspect about this event was the fact that the automatic missile defence system on board the corvette was switched off, thus it remains unknown how resilient the Kowsar is to this sort of defence.

### **[C-704](#) and [Nasr-1](#)**

This is the big brother to the C-701, with a similar top speed, cruise altitude, and accuracy. The main difference is its size, capable of transporting a warhead of 130 kg, four times that of the C-701, thus able to menace sea vessels up to 4000 tones of displacement. Another difference is a higher range, over 30 km, thus able to hit targets in Omani waters from land based launchers. Their main strength seems to be their low cost compared to other weapons able to target similar vessels. The number of units Iran has acquired from China is not public.

In 2008, Iran successfully tested a home made missile called [Nasr-1](#) that seems to be an upgrade of the C-704, with a larger warhead (150 kg) and a slightly longer range. Iranian officials have since then been quoted in the press saying Iran is presently mass producing these missiles; how many it may have produced already is an open question. Further tests have followed, always presented to the press as a success.

The relevance of this class of short range missiles is its numbers; though I couldn't track down a precise figure, some reports pointed to an arsenal over 300 units at the beginning of the century, before both the Nasr-1 and the Kowsar went into production.

### **C-601 and other Silkworm class missiles**

This was a class of very large missiles developed in China from original Soviet designs. During the Iran-Iraq war, the Chinese sold them to both sides and they were used in several important actions during the conflict. In general, these missiles carry half tonne warheads and have operational ranges in excess of 150 km. The [C-601](#) was the air launched class of this family that was also used by Iran against Iraq. Earlier versions were not very accurate (about 70% hit probability) and today wouldn't have much chance against modern defence systems. China kept supplying these missiles and an upgraded version, the C-201, to the Middle East; in 1988 sales of these weapons to Iran officially stopped, but Iran has today the capabilities to produce them. I haven't found information on numbers and more importantly, on what technological upgrades Iran may have introduced. In any case, the original Silkworm version is a weapon that is quite able to hit commercial vessels or other unprotected civilian targets, like it successfully did during the Iran-Iraq war.

### **C-802 and Noor**

The [C-802](#) is a high-range, high-accuracy missile developed in China. It is a two stage rocket that detaches part of the fuselage containing the take-off fuel at cruise speed. Cruising speed is just under Mach 1 (the speed of sound) and the autopilot can lower cruise altitude below ten meters if the sea isn't rough. It is highly resilient to electronic interference and has a low radar signature;

accuracy is reported in excess of 98%. It carries a 165 kg warhead capable of piercing warship armour. This missile is also thought capable of targeting large vessels, even larger than those targeted by the C-704. With a range of 200 km, this is clearly a fierce weapon, providing its owner serious military projection.

Iran ordered 150 C-802 from China in 1991. Shipping eventually stopped in 1996 under the pressure of the US with only 60 units delivered, a move that attests to the relevance of this weapon. Though they can be deployed from air, sea, or land, it is thought that Iran has all its C-802 in mobile land launchers, spread around the shores of the Strait of Hormuz and the Persian Gulf.

In spite of the suspension of deliveries from China, Iran was able to develop its own version of this missile, called [Noor](#), possibly introducing further developments. Numbers are unknown, but this weapon has been in production for several years; at least one successful test was reported by the press in 2006. This is one of the tactical questions of the Strait of Hormuz: how many Noor missiles Iran has and how accurate they are. Even so, the 60 C-802s are enough of a menace by themselves.



*An Iranian warship firing a Noor missile. Source: [MidEastSecurity.co.uk](http://MidEastSecurity.co.uk).*

### **SS-N-22 Moskit**

This is the most important sea warfare weapon Iran has. Originally called [Moskit](#), it was designed at the end of the Cold War by the USSR specifically to avoid NATO anti-missile defences. First of all it is very fast, cruising at Mach 3 at high altitude and Mach 2.2 near the surface; at maximum speed this missile can cross the Strait of Hormuz from coast to coast in less than one minute. Secondly, it is capable of executing random changes of direction when closing the target, thus making it very difficult for automatic defences to calculate its trajectory. This is a large missile, weighing 4.5 tones, capable of transporting a warhead of 320 kg; its range is reported differently from different sources but modern versions seem to reach more than 100 km. This technology was inherited by Russia, who has continued their development, producing more advanced versions. This family of missiles is usually referenced as the deadliest naval weapon in existence, with an accuracy rate over 99%.

Visiting Moscow in 2001, the Iranian Defence Minister requested a demonstration of these missiles and was impressed enough to order an undisclosed amount. Apart from this, information is scant, though speculation abounds. Iran certainly has this weapon, but in what quantities and exactly which version is not public. Was the order in 2001 the only one, or has Iran continued to buy these missiles? Has Iran acquired older or modern versions, in particular the upgraded Yukhon?



In the first years of the last decade, when it became known Russia was selling these missiles to China, India, and Iran, there was [speculation](#) that NATO had no effective defence against them. This known for more than two decades at the time, NATO surely has had the time to study ways to defend itself against these weapons. Nevertheless, NATO has never faced such missiles in combat and considering the close distances in the Strait, and the possibility of Iran using several of them in a simultaneous attack, the hypothesis of relevant damage inflicted in the event they are ever employed seems reasonable.



*A Moskit missile. Source: [Tactical Missiles Coorporation](#).*

### **Khalij Fars ballistic missile**

When this post was discussed at the EuropeanTribune, [some folk raised the question](#) of Iran having anti-ship ballistic missiles. Such is indeed the case, as about one year ago, a tactical missile named [Khalij Fars](#) (farsi for Persian Gulf) was presented to the press with nothing short of a spectacular demonstration. It carries a 650 kg warhead, has a maximum speed in excess of Mach 3, and a maximum range of 300 km. A missile this large on a ballistic trajectory should be relatively easy to defend against; during the Gulf War in 1991, NATO achieved a good deal of success against Scud missiles, which can reach speeds in excess of Mach 5. The only menace they may pose is when fired at close range targets, providing a short time window for defences to be deployed.

Apart from these air borne missiles Iran also possesses torpedoes worth writing about.

### **Hoot torpedo**

This is another weapon that attests to Iran's abilities to produce warfare material. The [Hoot](#) is a supercavitating torpedo, meaning that it travels through water inside a gas bubble, thus greatly reducing attrition. It is much faster than any torpedo used by NATO, able to reach speeds of 200 knots, which should make it more difficult to defend against. It greatly resembles the Shkval, a defensive torpedo developed in the old Soviet Union that is still produced today by Russia; but in this case, there are no reports of Iran having ever acquired the original. Claiming to have developed a totally independent design, Iran has successfully tested these home built torpedoes in recent years, always as offensive weapons. Notwithstanding its impressive speed, uncertainty remains as to the effectiveness of these torpedoes. Its range should be relatively small and should be noisy enough to be identified right from launch. As with all weapons produced by Iran, the main threat may be in the numbers available.

## **II.II Navy**

Part of Iran's anti-ship weapons require some sort of naval vessel to be employed far from the shore. Iran's navy thus is another important piece of the puzzle.

### **Submarines**

Most of Iran's submersible fleet is composed of midget submarines. This class of vessel was originally thought to be used for infiltration operations, but in the Strait of Hormuz and the Persian Gulf they acquire different purposes. Their small size, first of all, allows them to be manoeuvred in the shallow northern shores of the Gulf, and secondly, makes them harder to detect by sonar. Iran has in recent years built 17 [Ghadir](#) class submarines that are capable of deploying Hoot torpedoes. To these, add four old [Yugo](#) class submarines built in North Korea from a Yugoslavian design. In the shallow waters of Iran, these small vessels should be hard to detect and able to deploy mines and torpedoes without being immediately detected.

Iran acquired 3 [Kilo class](#) submarines from Russia in the early 1990s. These are about twice the size of the Ghadir, and conceived specifically for anti-ship operations in shallow waters. They are built with special tiles that distort and absorb sound, making it harder to detect by sonar at long distance.



FARS

Photo:Vahid Reza Alaei

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*An Iranian Ghadir class submarine. Source: [The Asian Defense](#).*

### Missile Ships

These are small and fast attack ships, conceived for near shore operations. Iran has ten [Houdong](#) class vessels built in China and capable of carrying eight large size missiles. In the late 1970s, Iran ordered 12 [Kaman class](#) gunboats, of which ten are still in service. In recent years Iran was able to build four copycat versions named internally as the [Sina class](#) gunboat. These 14 smaller vessels carry four mid size anti-ship missile launchers each.

### Speedboats

These are very small vessels carrying two torpedo tubes. In order to be effective, they have to get relatively close to their targets, thus largely exposing them to enemy fire. They rely on their high speed to be successful, both in approaching the target and retreating back to safety. Iran has over 70 [Peykaap class](#) vessels, partially of its own making and another 10 Tir class units. Both of these models are reported to have maximum speeds in excess of 50 knots (over 90 km/h). A newer version, the Peykaap-II, has been fitted with two missile launchers.

In 2010, Iran introduced 12 attack speedboats inspired by sports competition vessels capable of crossing the waters at some 70 knots (about 130 km/h). Called [Zolfaghar](#), beyond torpedoes, they can carry two small launchers to deploy Kowsar class missiles. Iranian officials have told the press that mass production of this class of speedboat started in 2011; the exact numbers the navy may have at this stage is unknown.



Photo:Vahid Reza Alaei

FARS NEWS AGENCY

*An Iranian Peykaap class speedboat armed with missile launchers. Source: [Fars News Agency](#).*

### Other vessels

Iran has several larger vessels that can also deploy anti-ship missiles. They are themselves relatively easy targets, hence their role in an armed conflict is uncertain. In recent years, Iran has built three frigates, reverse engineered from three others bought from the UK before the revolution; to these add three corvettes acquired in the 1960s. It has also 6 coastal patrol ships (3 recently built and 3 legacy from the pre-revolution), 2 mine-layers, 14 hover-crafts and over 20 amphibious vehicles. It also has over 80 inshore patrol ships of assorted sizes and makes, of which some classes are made in Iran.

## II.III Air Force

Anti-ship missiles can also be deployed from the air and Iran has quite a long list of aircraft able to do so. Apart from this, the Air Force may also have a crucial role in protecting Iran's navy and shores from NATO's air power. Following is a very condensed list by category:

- **Air superiority** - 60 or more jet fighters, of which 25 [MiG-29](#) recently updated, 25 or more [F-14 Tomcat](#) and 10 [Mirage F1](#).
- **Multirole** - over 150 jet fighters, of which 140 are 1960s [F-4](#) and [F-5](#) plus an unknown number of domestically developed [Saeqeh](#) (a copy of the F-5).



- **Interception** - 20 [Chengdu J-7](#) jet fighters.
- **Close air support** - 13 [Sukhoi Su-25](#) jet fighters.
- **Ground-attack** - 32 [Sukhoi Su-24](#) plus an unknown number of [Azarakhsh](#) (the first attempt by Iran to copy the F-5, in development since 1997).
- **Helicopters** - over 50 of assorted designs and purposes, mostly built in US before the Revolution.



*An Azarakhsh type jet fighter in flight. Source: [IranDefence.net](http://IranDefence.net).*

Apart from these there are also some noteworthy models:

- [Chengdu J-10](#) - This is a state of the art multi-role jet fighter developed in recent years by China. With a maximum speed over Mach 2, operational range of some 2500 km and highly manoeuvrable, it is a jet fighter perfectly able to engage NATO fighters like the F-18 on equal footing. In the realm of non-stealth, manned aircraft, this is one of the best options in terms of technology for the money in the market today. [Iran acquired two squadrons](#) (24 units) that were delivered between 2008 and 2010. Iran's Air Force made a major leap with this acquisition.
- [Chengdu/PAC JF-17 Thunder](#) - This is a multi-role jet fighter developed by China to fulfil specific requirements of the Pakistani Air Force. With an operational range of 1300 km and a maximum speed of Mach 1.6 it is not as powerful as the J-10 but much cheaper. Nevertheless it is able to face modern NATO aircraft, especially in defensive missions. Iran ordered an undisclosed number of these jet fighters from the Chengdu company in 2003. Due to the specificity of its requirements, Chengdu renamed this version the FC-1.



Production started in 2006 and from then on little is known.

- [Sukhoi Su-30](#) - The Su-30 was born as a Soviet counterpart to the F15E Strike Eagle; developed at the end of the Cold War, it was conceived primarily for air interdiction missions. With a range over 3 000 km and top speed of Mach 2, this is a jet fighter capable of engaging any other modern military aircraft. Years ago [news emerged in Israel](#) that Iran had ordered 250 of these jet fighters from Russia, a deal that would increase to 2 G\$; this was never confirmed and such high figures would likely have attracted much more attention. In 2008, Israeli journalists again claimed to have observed a squadron of Su-30 jets in operations during war games in Iran, a claim once more unconfirmed. Though it doesn't seem likely Iran has hundreds of these aircraft, it seems possible that jet fighters may be among all the warfare material it has been acquiring from Russia. In case Iran possesses any relevant numbers, say two squadrons, it becomes an entirely different military power in the region. This is one of the great mysteries in the chessboard of the Strait of Hormuz.



*A Chengdu J-10 in flight. Source: [Air Power Australia](#).*

## II.IV Anti-air defences

Completing the list of relevant weapons are Iran's anti-air defences. These may determine how well Iran can protect its military assets in the shores of the Persian and Oman gulfs.

### **Mersad, Shahin and Shalamche**

With another well-advertised public demonstration, Iranian officials announced the serial production of the [Mersad](#) defence system in 2010. It is a fully digital radar and control system coupled to a missile launch pad, firing the Shahin missile. This missile is also produced in Iran, being an upgraded version of the US made Hawk missile, with a higher and longer range and a top speed of Mach 2.6. Development of this system has been continuous and during 2011, a new version of the missile was successfully tested. Called Shalamche, it has a top speed of Mach 3 and a range of 40 km; it can hit a target 30 km away in less than 30 seconds. Deliveries of the Shalamche to Iran's Army started last September.



*A Shahin missile being fired from a Mersad launching pod. Source: [ArmyRecognition.com](http://ArmyRecognition.com).*

### **S-300 and Bavar-323**

The [S-300](#) is a state-of-the-art air defence system initially developed by the USSR in the 1970s. It was inherited by Russia, who kept developing, upgrading, and selling it to a multitude of clients worldwide. This system is basically a semi-trailer truck transporting radar, a firing control sub-system, and a set of surface-to-air-missiles. Modern-day versions can follow up to 100 targets, either jets or cruise missiles and engage 12 simultaneously in a radius of 150 km. After much speculation about a possible deal between Iran and Russia, in 2009 officials from both sides confirmed that deliveries of the system would start soon. One year later, Russia suspended all weapons sales to Iran as a consequence of a United Nations resolution, and the delivery wasn't completed. How many were delivered, if at all, isn't public, but it certainly was an insufficient number for Iran immediately started the development of its own version. Iran later claimed to have acquired further units from Belarus and another unidentified second-hand seller. Speculation exists also on a possible acquisition from Libya.

In the wake of the *débâcle* with the original deal, Iran made the development of a similar system a national design, involving top civilian and military scientists. Building on its experience with short to medium range systems Iran was able to complete the first prototype of the Bavar-323 last year. Up to the moment serial production hasn't been announced.

### **S-200 and Fajr-8**

Another ancient system developed in the USSR, inherited by Russia, sold to Iran and now replicated there. Russia has been continuously developing the system that is composed of radar, a control system, and a static missile rail. In modern versions it fires a 7 ton missile with a range of 300 km, a maximum flight altitude of 40 km, and is capable of flying at 7 times the speed of sound. Iran reportedly has 30 missile rails of this version, though I couldn't determine if it also possesses modern versions of the missiles. In any case, Iran has been producing for years its own version, the Fajr-8, for which little to no information is available, apart from it being an upgrade to the original [S-200](#). These missiles were highly thought of in an epoch when high-altitude nuclear bombers were the main strategic weapon a military power could have. In the narrow scenario of the Strait, they may never have an important role, but may provide Iran the ability to defend itself from air attack at high altitude.

Beyond these, Iran possesses a further host of surface-to-air missiles, some acquired from Russia and China, and others developed internally. They range from small, portable anti-helicopter anti-aircraft rockets to large, long range, anti-cruise missile systems. Operational numbers are unknown for most of these. At the European Tribune [some fellow bloggers pointed out](#) that the Iranian Air Force lacks any sort of airborne early warning system (basically an aircraft carrying a radar), which is today considered an essential component of anti-air defence infrastructure. How determinant this may be in the theatre of the Strait is an open question, but if Iran will ever come to face a large scale conflict, this will certainly be a disadvantage.

## II.V Summary

The larger part of Iran's military technology is outdated, with several pre-revolution legacy systems still in service. Iran has learnt through the years how to reverse engineer and replicate these technologies to the point where it now possesses very relevant numbers of weapons ready to use. These homegrown technologies are often publicly displayed in war games and are much celebrated by armed forces officials and politicians alike. Some of these weapons are effectively dangerous, like the midget submarines operating in shallow waters. Others, like the missile armed speedboats, are weapons whose particular effectiveness is largely unknown. These simpler technologies are menacing much more for their numbers than anything else. They probably give Iran the ability to sustain a military conflict around the Strait for some time.

And then there are the many state-of-the-art weapons acquired from Russia and China in recent years. Regarding these, the information available to the public is scant, sometimes even contradictory, as most arms deals have been shrouded in secrecy. The numbers and accuracy of these technologies are unknown in most cases, preventing a clear image of Iran's true military power. Is this uncertainty just part of an attempt by Iran to project an image of military power larger than what it actually has? Or is it part of the acquisition strategy to protect sensible deals that could raise objections from the West? In any case, the few weapons known for certain to be owned by Iran, like the Moskit missile, the S-300 air defence system, or the J-10 jet fighter are enough to discredit any idea of immediate superiority by NATO over Iran.

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*Naval Forces around the Strait of Hormuz, click for full size. Source: [International Institute for Strategic Studies](#).*

## Part III – Strategic Scenarios

Can an armed conflict erupt in the Strait of Hormuz? How can it come about? How wide can it develop? For how long can it disrupt commercial traffic? In this part, I formulate four different strategic scenarios that contemplate these questions, though not precisely answering them.

### Scenario I – Direct engagement from Iran on commercial vessels at the Strait.

In this scenario Iran would employ one of its many seaborne weapons to either attack or block the way of oil tankers leaving the Persian Gulf. This could be done by torpedoing the vessel or targeting it with a small missile; alternatively, Iran could simply deploy some of its navy close to the commercial routes and emit a warning that every ship trying to cross the Strait would be

sunk. The effect on oil prices would be immediate in the second case, even without firing a single shot. It would be a sheer powerful defiance by Iran, aiming to guarantee that economic sanctions affect every major player in the region.

This would certainly force an intervention by NATO forces in the region, a scenario that could develop in two different ways. If NATO opts simply for defending navigation across the Strait, then the multitude of weapons Iran has would likely guarantee a long period of tension, with random attacks on both commercial and military vessels in the Strait. The economic consequences for the Asian importers would be dire and a worldwide recession would ensue. Otherwise, NATO could opt for a large scale operation to bring down Iran's military capacities around the Strait. This would then resemble Scenarios II and III, whose outcome is not clear, especially in terms of the conflict time span.

I find this scenario the least likely of all. This would not only be an attack on oil importers, it would be above all be an attack on the major oil exporters around the Gulf. Iran has little interest in going at odds with its neighbours, especially in the case of the UAE, with whom it maintains a close economic relationship. Apart from the Emirates, Iran shares maritime oil and gas resources with Qatar, Saudi Arabia, and Kuwait, that are in some cases already under joint development. And of course there is Iraq, with which Iran shares a long border that was the stage for a long and deadly conflict in the 1980s; certainly it is in no one's interest to revive such tensions. A bold action like the one proposed in this scenario would require a totally desperate internal situation in Iran, and even so, Scenario II would be more plausible.

## **Scenario II – Direct engagement from Iran on military vessels in the Persian Gulf.**

Instead of attacking or menacing commercial vessels, Iran could opt for an engagement on NATO's naval forces in the Persian Gulf. The effect on oil prices would be about the same as in scenario I, but without the sense of a direct attack on Iran's neighbours. This sort of engagement could come about as a consequence of some minor incident, such as a NATO vessel entering Iran's waters or an Iranian aircraft or ship being hit. An incident like this can easily be faked if needed, but unfortunately, the growing tension and the bellicose discourse around the Strait can also provide for a real episode where at least one of the players feels compelled to larger actions.

Invariably this scenario would lead to a large scale conflict, not only in the Strait but extending at the very least to Iran's long southern coastline. The outcome of such hypothetical conflict is elusive, but one thing is certain given Iran's profuse weaponry and extensive territory, it can hardly be swift. Many uncertainties remain in surmising the correct power balance in the Persian Gulf at this moment. Is Iran's wide range of anti-ship missiles and torpedoes capable of imposing damages on NATO's fleet? Not only is the effectiveness of weapons like the Russian Moskit unknown, but the outcome of a wide simultaneous engagement with a multitude of anti-ship weapons on NATO's vessels is also not clear. In the worst case, NATO's fleet may be forced back to its naval bases in Bahrain and the UAE, and to operate solely from the Gulf of Oman. If something like this would ever happen, oil shipments across the Strait would be certainly affected for a long period of time, and the impact on the world economy would be devastating.

A second question is Iran's capabilities in air defence. Can NATO project its air prowess as it did in the Balkans, Iraq, or Libya? NATO will certainly face a sort of opposition it never did before, both in the number and in the technology of anti-air missiles retained today by Iran. In addition to this, if Iran effectively possesses relevant numbers of modern-day jet fighters, then air dominance over Iran becomes completely uncertain. Nevertheless, NATO retains technology that Iran has no known counter measures against, especially state-of-the-art stealth aircraft built in



the US. Hence it is certain that in case of such a large scale military conflict, NATO can continuously target military objectives in Iran, eventually eroding its operational capabilities. The question is how long such conflict can last to menace oil shipments across the Strait. Stabilization of the region could require a sort of military commitment NATO has never been forced into before. How could this play out with a ramping oil price conflated with the ongoing economic environment is hard to envision.

Though I find this scenario more plausible than scenario I, it still remains quite remote. Iran's government still has other options to explore before finding itself in a desperate situation where military action becomes attractive.

## **Scenario III – Military engagement by NATO on Iran**

In such a scenario, NATO would opt for a pre-emptive attack on Iran, targeting both Iran's nuclear facilities and military assets around the Strait. This scenario has been spun both in Israel and the US, especially since Iran has threatened to close the Strait in retaliation against the hardening of economic sanctions. While it has been largely dismissed by the wider political spectrum, it should be noted that from a strict military perspective this is the conflict scenario that could be less costly for NATO members. Taking the initiative, it could guarantee the shortest disruption possible to the flow of oil through the Strait. Most of this oil (85%) feeds Asia; NATO members are already on course to phase out Iranian oil imports and the strategic oil reserves coordinated by the IEA would provide the means to accommodate the economic impact for some time.

The first problem with this strategy is if NATO is not able to promptly achieve air superiority over Iran, in such case not being able to tame the country's menace to the oil flow in the Strait in a timely manner. As stated before, this largely depends on the numbers of modern aircraft and air defences Iran effectively possesses. If a relevant resistance to NATO's air power is achieved, then a situation similar to the worst case of scenario II could develop.

Finally, in the event a wider military conflict develops between NATO and Iran, the much bigger question arises of how other military powers may react. In recent months, military officials from both China and Russia have made it clear they wouldn't remain passive in the face of such conflict. This discourse may be an important deterrent to this scenario or any wider conflict in consequence of scenarios I or II.

With the information I could gather, it seems to me this option is risky (or at least uncertain) enough for NATO not to take it at this stage. It should remain a remote hypothesis, at least as long as real evidence of a military nuclear programme in Iran doesn't come about. Finally, I should point out that considering Iran's vast arsenal, a lone attack by Israel seems highly unlikely, at least with conventional weapons.

## **Scenario IV – No military action**

At this stage, the most likely scenario is for no bellicose action to take place. This scenario has several requirements, but all achievable. In the first place the Iranian government has to stabilize its currency; so far this has been achieved by cracking down on the independent trade of foreign currency and gold, first by disabling the electronic means to do so and then by outlawing such activities. In this regard more will have to happen, as the government has to somehow re-establish public trust in the internal economic system. And then Iran must find ways to continue selling its oil, either by finding alternative importers, like Korea, that are not complying with US

sanctions, or by “smuggling” oil to neighbouring countries that then sell it as their own. The fact that about 30% of Iran's foreign trade takes place in the parallel economy can be an important start for this alternative trade. It is unclear what role the joint oil developments in the Persian Gulf may play, but they can provide a further workaround for Iran to maintain its oil revenues.

Iran's economy will be undoubtedly impacted, but as seen in section I, it is rather self-sufficient, especially in agriculture. Some consumer goods may become difficult to get, as it is already happening with [consumer electronics](#), but Iran should be able to provide the basic needs of its people in the short term, and once again seek alternative sources for its imports. It is unlikely that a Persian Spring will start to unfold. That the political system allows for public will to be expressed by voting and direct opposition to the theocratic structure has been a fable, squashed by fierce control of the media and internet. Thus, the political situation may remain relatively intact, facilitating a pure economic strategy from the crisis. If this scenario unfolds, it could simply result in a regionalization of Iran's foreign trade, geographically constraining commercial exchanges to the Middle and Far East. Naturally China can play a major role in this process, and while some officials have been suggesting a compliance with the US line, it is in China's interest to keep Iran somewhat inside its sphere of influence.

The only issue with this scenario is that it doesn't guarantee to the US and NATO that Iran's nuclear programme is halted. On the contrary, the technical advances of Iran's nuclear technology keep on going, [as recently announced by President Ahmadinejad](#). Though no evidence exists that this programme has military ambitions, those countries fearful of such a perspective, especially Israel, may get no reassurances at all from the increased sanctions. Will they rest quietly while Iran proceeds with the programme? This is why the previous three scenarios, though unlikely, are plausible.

## Conclusions

The balance of interests around the Strait of Hormuz can be analysed from a Games Theory perspective. All players profit from the trade that passes in both senses through this choke-point, and any disruption has a negative impact on all of them; since they all stand to lose, no player changes strategy and the game remains in equilibrium. The sanctions imposed by the NATO members on Iran menace this equilibrium, as they can eventually translate into an effective disruption of the Strait, closing it to Iran for the large part. NATO has chosen this strategy because it now evaluates the equilibrium as having a negative impact: the hypothetical nuclear menace from Iran. In its turn, if the Iranian foreign trade is seriously impacted, then further disruption to the Strait stops having a negative impact internally, and a strategy change to active disruption becomes profitable because it has negative impacts on other players. NATO has indeed played boldly and it remains to be seen how deep the consequences may be.

For now military action seems a remote hypothesis. Iran still has the ability to keep the Strait open to its ports, in spite of the sanctions. And naturally Iran can always at some point decide to abide by the inspections from the IAEA. Likewise, from the NATO side, military action appears an unlikely scenario, as Iran's prolific military technology seems a deterrent on its own, to which can be added the unpredictable reactions from other major players at the global scale.

If a military conflict ever develops around the Strait of Hormuz on the wake of this new batch of sanctions, it will be a definitive clarification of power over the region. In the three decades following the proclamation of the Carter Doctrine, wars in the region raged for a total of twenty years. NATO imports ever less oil from the Persian Gulf and its economic might has clearly waned during the last decade. Is the Carter Doctrine still affordable these days? Is it even practicable? A military clash at the Strait of Hormuz will certainly answer these questions.

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