Iran's Defense Strategy: Naval Forces, Ballistic Missiles and Cyber Capabilities

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The inauguration of the second Rouhani Administration has intensified the debate on the Islamic Republic's defense posture and its relations with neighboring countries and the United States. Since the 1979 Islamic Revolution, relations between Tehran and Western powers, led by the United States, have been characterized by mutual suspicion and hostility. Iranian leaders claim that Western powers, particularly the United States, have never accepted the Islamic Revolution. Meanwhile, Washington and its allies have accused Iran of sponsoring terrorism, abusing human rights, and meddling in the domestic affairs of its neighbors. The dispute over the nuclear program had dominated the debate for most of the last two decades.

The signing of the nuclear deal (also known as the Joint Comprehensive Plan of Action, JCPOA) in July 2015 was supposed to open a new page in the relations between Iran and Western powers. To be sure, since the Agreement went into effect (January 2016) relations between Iran and several European countries have improved. But, very little, if any, change has taken place in the relations with Washington. The latest twist in the tensions between the two countries has arisen from the election of Donald Trump who has "put Iran on notice" and has strongly sided with Iran's rivals in the Persian Gulf, while not formally distancing the United States from the JCPOA. In a visit to Saudi Arabia, April 2017, Secretary of Defense Jim Mattis repeatedly warned against what he described as the malign influence of Iran, "Everywhere you look, if there's trouble in the region, you find Iran."[1] From Iran's perspectives, this means that the country has continued to be surrounded and threatened by the much more powerful and

advanced United States and its well-armed Arab allies. Under the Pahlavi regime, Iran was a major player in the United States' 'twin pillars' strategy, drawn to ensure regional security and stability 'governed by America's local allies.' Accordingly, Tehran had access to the most advanced American and European weaponry and was involved in many forms of military cooperation with Western powers. Since the 1979 Revolution, however, Tehran has been under different sanction-regimes and, unlike its regional rivals, has been barred from access to advanced Western weapons systems. Despite being portrayed as an aggressive regional power, despite being one of the largest and most populated countries in the Middle East, its military expenditures, both in absolute and relative terms, have been quite modest and constantly much lower than those of its neighbors.

Country	Current US$ in million			Per capita in US$			% of GDP		
	2014	2015	2016	2014	2015	2016	2014	2015	2016
Iran	15,801	14,174	15,882	195	173	192	3.81	3.63	3.85
Israel	20,152	15,400	15,878	2,935	2,298	2,322	7.53	6.18	6.09
Saudi Arabia	80,762	81,853	56,898	2,953	2,949	2,021	10.71	12.67	8.92

 Source: International Institute for Strategic Studies, Military Balance 2017, London: Routledge, p.556.

These stark differences in military spending (and therefore capacity) between Iran and its regional adversaries as well as the heavy U.S. military presence have left Iranian strategists with few options. Several factors have shaped the Iranian policymakers' efforts to articulate a

broad defense strategy. These include geography, history, lessons learned from recent military conflicts, ideological orientations, and perceived national threats and interests. Geography is a key variable and the Persian Gulf and Strait of Hormuz figure predominantly in the county's national security and economic prosperity. This is where almost all the country's oil is shipped through and also where the United States fifth fleet is stationed. Geopolitics is informed by history and while many refer to the glorious past of the Persian empires, others are more conscious of the role that foreign powers (Great Britain, Russia, and the United States) have played in shaping Iran's destiny, often intervening to prevent Iran from reaching its potential as the dominant regional power. Finally, the experiences of the Iran-Iraq war (1980-88), the Kuwait crisis (1990-91), direct U.S. involvement in Afghanistan since 2001, and U.S.-led military intervention in Iraq (2003) have highlighted the limitations of 'traditional' warfare (i.e., a national army fighting another national army) against a much powerful and technically superior military adversary.

A combination of these factors prompted Iranian leaders to look beyond classical military planning in pursuit of an asymmetrical warfare strategy. The pillars of this asymmetrical strategy include naval forces, ballistic missiles, and cyber capabilities. The deployment of naval forces, ballistic missiles, and the improved cyber capabilities have their own advantages and disadvantages, of course, but a close examination of these asymmetrical tactics suggests that a military confrontation with the Islamic Republic would likely be complicated and less predictable, with uncertain political and military outcomes. Any military confrontation with Iran is certain to further destabilize the Middle East and spillover into South Asia as well. Another approach would suggest building consensus on the strategic and economic areas of mutual

interest between the United States and Iran and support the efforts to re-construct the security

architecture in the Middle East in a manner that would promote confidence-building and

cooperation between all regional players. This is the path not taken, we suggest.

Asymmetrical Warfare

War is essentially a struggle between adversaries, where they employ different forms of

both hard and soft power to achieve political objectives. In almost all wars, there are some

disparities between the two sides. However, when these differences are fundamental, they give

the stronger party certain advantages and the weaker one some disadvantages. This asymmetry

does not mean that the outcome is certain and the less-advantaged opponent has no options.

Indeed, victory does not always go to the military superior force. Rather, history is full of

examples where the stronger side fails to impose its will on the weaker party. One of the

strategic options adopted by the less powerful adversaries is recognition of its weaknesses and

adoption of asymmetrical warfare as the most viable option.

United States Department of Defense defines asymmetric as "the application of

dissimilar strategies, tactics, capabilities, and methods to circumvent or negate an opponent's

strengths while exploiting his weaknesses."[2] Ellen Sexton argues that the term asymmetrical

warfare is typically used "to mean warfare between two forces that are not simply unequal, but

that are so significantly different that they cannot make the same sort of attacks on each

other."[3] In their definition, Steven Metz and Douglas V. Johnson II focus on the nature and

objectives of asymmetrical warfare, arguing that asymmetry "is acting, organizing, and thinking

differently than opponents in order to maximize one's own advantages, exploit an opponent's

weaknesses, attain the initiative, or gain greater freedom of action. It can entail different methods, technologies, values, organizations, time perspectives, or some combination of these."[4] These definitions highlight the disparity between the adversaries and the 'unconventional' strategies to overcome this imbalance in traditional military power. In asymmetrical warfare, the weaker side does not seek to fight the stronger one militarily; rather, the goal is to weaken the superior party's political will to keep fighting.

Strategic and operational asymmetries are as old as warfare itself. In recent U.S. military history, Vietnam War provided clear evidence of these different ways of fighting war. As Henry Kissinger argued, "We fought a military war; our opponents fought a political one. We sought physical attrition; our opponents aimed for our psychological exhaustion."[5] The moving away from 'traditional warfare' to 'asymmetric engagement' has gained momentum in the post-Cold War security environment. In the 1991 war to liberate Kuwait the U.S. military used its technological superiority and massive firepower to defeat Saddam Hussein's army in just a few weeks. More or less similar military strategies were implemented in the 2001 war in Afghanistan and the 2003 war in Iraq. But the violent insurgencies that followed these wars have underscored the U.S. vulnerability to an asymmetrical warfare. As a result of these campaigns a growing consensus has emerged regarding how future conflicts would unfold, leading to the conclusion that "future conflicts will require a vastly different set of tactics, equipment, training, and skills than conventional military engagements of the past."[6] The National Defense Panel, a senior-level group commissioned by the Congress in late 1990s echoed similar sentiments: "We can expect those opposed to our interests to confront us at

home and abroad – possibly in both places at once – with asymmetrical responses to our traditional strengths."[7]

Within this security environment, the United States enjoys key advantages. Washington invests substantial resources in upgrading its military capabilities, including personnel, training, equipment, information gathering and analysis. Equally important, over time the United States has forged close partnerships and alliances with countries around the globe, whose military capabilities – often supported by the United States – further contribute to U.S. strategy of confronting asymmetrical challenges. On the other hand, there are some risks and vulnerabilities in confronting unconventional warfare. So, if the main objective of the opponent is to weaken the political will to sustain a long and costly war, under such circumstances maintaining the necessary national consensus supporting military operations is a daunting challenge.

Against this background and learning important lessons from recent military conflicts in the Persian Gulf and South Asia, Iranian leaders have articulated an asymmetrical strategy to confront the United States and its allies. The goals include projecting power, deterring a potential attack, and in case of war, making it a long, and costly confrontation in both human and material resources inevitable.[8] This asymmetrical strategy is the outcome of a consensual process that includes all major figures in the Iranian religious, political, and security establishment. The Supreme Council for National Security (SCNS) is responsible for making defense policy and defining security strategy. All senior military leaders, heads of each branch

of government (executive, legislative, and judiciary), and several cabinet ministers (including those of defense, foreign affairs, interior, and intelligence) are members of the SCNS.[9]

The Islamic Revolutionary Guard Corps (also known as Pasdaran or Sepah) is a leading force in implementing the country's asymmetrical defense policy. The IRGC was created in May 1979 to defend the Islamic Revolution against internal and external enemies. Since then it has expanded its influence in both the security and policy apparatuses as well as in the economic system. The IRGC is an institution of the state and has its own army, navy, and air force and coordinates policies with militias and political parties overseas, mainly through the Quds Force.[10] The Sepah's role is enshrined in the constitution of the Islamic Republic (Article 150) and is assigned with specific but wide-ranging responsibilities: "The Islamic Revolution Guards Corps, organized in the early days of the triumph of the Revolution, is to be maintained so that it may continue in its role of guarding the Revolution and its achievements."[11] The IRGC is separate from the Artesh (conventional armed forces), but there is a great deal of cooperation and coordination between the two forces.

Naval Forces

Iran has long coastlines on the Persian Gulf, Gulf of Oman, and the Caspian Sea. Perceiving itself as the dominant regional power, Tehran, both under the Pahlavi and Islamic regimes, has called for the non-intervention of foreign powers in the security of these crucial waterways. In May 2017 Navy Commander Rear Admiral Habibollah Sayyari stated that "only countries of the region may provide security in the Persian Gulf and the Sea of Oman while

presence of trans-regional states will always create tension and crises in the region."[12] This has been the official policy for decades.

Oil was discovered in Iran in the early twentieth century. Since then, like many of its neighbors, Iran has grown more dependent on oil revenues as the major source of its national income. Almost all its oil exports are shipped to foreign markets via the Persian Gulf. This geopolitical reality has underscored the need to create a strong navy to protect maritime export lanes. The Imperial Iranian Navy (IIN) was established shortly before Second World War, but its operations were overshadowed by the much more powerful British navy. At least three developments gave significant momentum to the IIN in the 1970s – the British withdrew east of the Suez, rising oil prices, and the Shah enjoying a close security relationship with Western powers. In other words, the Shah had the financial resources and limited, if any, political constrains to realize his ambition of building a strong navy. Iran bought frigates, destroyers, corvettes, patrol crafts, and other equipment from the United States, Britain, France, Germany, and other European countries. The remnants of the Shah's IIN survived to form the core of the new Islamic Republic navy.[13]

The Iran-Iraq War represented another major turning point in the re-construction of Iran's naval forces. In the mid-1980s Iraq started attacking Iranian oil shipping and maritime infrastructure. Tehran retaliated by laying mines and attacking Iraqi and other Arab countries' commercial vessels in what became known as the 'tanker war.' The United States Navy was drawn into this war, re-flagging and protecting Kuwaiti vessels. This led to few but serious confrontations between the U.S. and Iranian navies in which several Iranian vessels were

destroyed. Iranian strategists concluded that in a classical naval engagement Tehran would quickly be overwhelmed.[14] The destruction of the Iraqi armed forces in the 1991 Kuwait War further underscored this conclusion.

The lessons learned from these military conflicts helped Iranian leaders to articulate and develop their asymmetric irregular warfare doctrine. The main theme of this doctrine is to capitalize on atypical assets such as surprise, speed, maneuverability, flexibility, adaptability, and decentralization of the command structure.[15] This strategy is also known as 'Passive Defense' defined as: "Measures taken to reduce the probability of and to minimize the effects of damage caused by hostile action without the intention of taking the initiative."[16] The underlying objective is to take advantage of perceived U.S. vulnerabilities and capitalize on geographical advantages. Specifically, the shallow waters of the Persian Gulf, narrow waters of the Strait of Hormuz, and the presence of numerous small islands restrict the maneuverability of U.S. navy and help maximize the flexibility of the Iranian small vessels.[17]

This strategy has led to the reorganization of the country's naval forces. Like other countries, Iran keeps upgrading, modernizing and readjusting its naval forces to meet new challenges and improve their performance. In 2007 the Islamic Republic of Iran Navy (IRIN) and the Islamic Revolutionary Guard Corps Navy (IRGCN) underwent a reorganization that included new base openings, a re-division of duties, and a re-assignment of areas of responsibilities. This process underscored the specific culture, capabilities, operations, and missions of each force. The IRIN was assigned to the Gulf of Oman and the Caspian Sea. It was originally created to be a blue-water force capable of demonstrating the power and prestige of the Pahlavi regime. It

operates traditional large warships, frigates, corvettes, and a small number of submarines

designed to carry out extended missions in open waters.[18] Most of its original equipment was

purchased by the Shah from Western countries so since 1979 Tehran has had limited access to

these sources and for a number of years was not able to provide the necessary maintenance

and upgrading. These restrictions negatively impacted the IRIN's performance during the Iran-

Iraq War. To project its capabilities, in the last few years Tehran has thought to extend its reach

and power by dispatching some of its IRIN vessels to the Red and Mediterranean Seas as well as

to the Indian and Pacific Oceans. The IRIN, like other traditional navies, has routinely engaged in

bilateral exercises with regional and international powers, including the Royal Navy of Oman,

Pakistan Navy, and Kazakh Naval Forces.[19] It has increasingly taken the responsibility of

combatting piracy close to Bab al-Mandeb Strait, and in this role, Deputy Navy Commander

Rear Admiral Peyman Jafari has announced that the IRIN has escorted 2,100 cargo ships and oil

tankers since 2008.[20]

By contrast, the IRGCN was given full responsibility for operations in the Persian Gulf.

Created in 1983 in the midst of the war as a non-traditional force, it has adopted an asymmetric

doctrine. It operates a fleet of small boats (purchased from Italy, China, and other countries)

that lack the configuration to remain in the sea for an extended period of time or to be

deployed far from the homeland. The force controls batteries of relatively short-range, but

deadly, anti-ship missiles.

The IRIN and the IRGCN share responsibility in the Strait of Hormuz. Since the naval

reorganization of 2007, both navies have engaged in a dynamic acquisition program. They

maintain a large inventory of anti-ship cruise missiles, torpedoes, mines and defense equipment. Some of the weaponry has been obtained through foreign acquisitions, others are domestically produced. While still lagging behind leading industrial countries, nevertheless Iran's defense industry "has made significant strides in equipping its navies and other military services with a broad range of capabilities."[21] This means Iran has the capability to target any point within the Strait of Hormuz and much of the Persian Gulf and the Gulf of Oman. They seek to enhance their intelligence capabilities by developing satellite, cyber-technologies, and drones. Their main strategic objectives include maintaining strong deterrent measures against potential attacks, defending the coastlines, protecting oil and other commercial shipments, and projecting power. Located between Oman and Iran and connecting the Persian Gulf with Gulf of Oman and the Arabian Sea, the Strait of Hormuz is the world's most important chokepoint.[22] This means the Persian Gulf and the Strait of Hormuz are of critical economic and strategic importance to Iran, other regional powers, and indeed to the entire world. Almost all oil and natural gas tankers from the Persian Gulf to global markets must cross the Strait. The most recent exception is the Abu Dhabi Crude Oil Pipeline (opened in June 2012), which gives the United Arab Emirates a direct link to the Gulf of Oman and from there to global markets.[23] However, land pipelines do not provide sufficient alternative export routes.[24] Iran might have the capability to temporarily disrupt commercial traffic through the Strait of Hormuz using a combination of submarines, small boats, mines, and cruise missiles. However, closing the Strait of Hormuz would cause Iran tremendous economic damage. Thus, this option would not be taken lightly and would be considered under severe conditions to signal that an attack on the Islamic Republic could have serious global economic repercussions.

Iran's naval strategy in the Persian Gulf has its own advantages and disadvantages. High-speed-small boats are difficult to detect and identify. They enjoy a high level of flexibility and maneuverability. On the other hand, they suffer from major limitations such as light firepower and short endurance. Given these characteristics, they have represented a major challenge (and irritation) to the U.S. fifth fleet. On several occasions they have approached large U.S. ships, bringing the two sides to close confrontation. In order to prevent unintended escalation, some proposals such as establishing a direct hotline between the American and Iranian commanders, or agreeing on rules of engagement between the navies have been considered, but not approved. Meanwhile, the Iranians will keep investing in improving their naval capabilities. In the foreseeable future at least four factors are likely to impact these efforts: A) Iranian leaders' perception of national threats and interests; B) United States' and its allies' policies; C) Oil prices (higher prices mean more financial capability to modernize the two navies); D) The implementation of the nuclear deal (gradually Tehran is being freed from restrictions on buying weapons). These factors will also shape the efforts to modernize and expand the ballistic missiles arsenal.

Ballistic Missiles

In the last several decades, Iran has developed the largest and one of the most diverse missile forces in the Middle East. The IRGC plays a key role in maintaining and developing the ballistic missile capability. As is noted, the missile program is a "complex and sophisticated response to the nation's unique security challenges."[25] Iranian leaders have constantly confirmed that the program is solely for defensive purposes and is part of the republic's

deterrent strategy. These assurances, however, have done little to allay regional and global

powers' concerns and suspicion. Missile tests are widely publicized by Iranian media and since

the Joint Comprehensive Plan of Action (JCPOA) was signed in July 2015, test-firing of several

ballistic missiles have been publicized, including in late January 2017 upon President Trump

taking office. The Trump Administration immediately responded by officially putting Iran on

notice. Michael Flynn, then White House national security adviser, warned that "the days of

turning a blind eye to Iran's hostile and belligerent actions toward the United States and the

world community are over."[26] In response, Brigadier General Amir-Ali Hajizadeh, the

Commander of the Aerospace Division of the IRGC stated, "If the enemy sets a foot wrong, our

roaring missiles will fall on them."[27] The stage is set for a broadening crisis.

For decades, ballistic missiles have been a crucial element of Tehran's military doctrine.

The U.S. Defense Intelligence Agency defined the drive behind Iran's missile programs as

regime survival, making Iran preeminent regional power, and turning Iran into an economic,

scientific, and technological powerhouse.[28] In other words, the main forces that drive the

missile programs are:

- To deter potential attacks by the United States or any of its allies;

- To protect the Islamic Republic's regional allies (both states and non-state

  actors);

- To demonstrate technological and scientific advances both internally and

  internationally.

The roots of Iran's sophisticated program can be traced back to the 1970s, when Iranian military officers worked with their Israeli counterparts to initiate a missile program known as Project Flower.[29] Iran supplied the funds and Israel provided the technology. These early efforts were aborted following the revolution, but the war shifted attention back to the missile program, particularly in the face of high attrition rate of Iran's sophisticated air force and lack of access to parts. With the deterioration of relations with Western powers, Iran's air superiority swiftly diminished, leaving Iranian cities and population centers vulnerable to repeated attacks by the Iraqi combat aircraft, artillery and ballistic missiles. Foreign Minister Mohammad Javad Zarif described the dramatic impact of these attacks thus: "Our people do not forget the fact that they were being bombarded. Everybody was providing assistance to the aggressor."[30] In response to the Iraqi attacks, Iran purchased Soviet-made Scud-B and Scud-C missiles from Libya, Syria, and North Korea,[31] and following the war continued to invest heavily in building and developing its missile program. Initially, Tehran relied heavily on foreign assistance, particularly from North Korea, Russia, and China. But gradually it has developed an impressive indigenous capability. A recent study by the International Institute for Strategic Studies concluded that although Iran probably remains dependent on foreign suppliers of key components for its liquid-propellant missiles, "it has increasingly focused on missiles fueled by solid propellants and has made significant strides toward self-reliance."[32] A report by the Congressional Research Service echoed a similar conclusion, arguing that "over the past few decades, Iran has progressed from relying entirely on the outright purchase of ballistic missile systems to becoming nearly self-sufficient in important ways."[33] Keeping the missile program robust and competitive and developing new systems will require sustained investment and

strong political support, which has thus institutionalized the program as a pillar of the country's

defense posture and a symbol of national prowess.

Iran's arsenal is sophisticated and multi-purpose and to meet Iran's defense posture,

includes a diverse collection of short-range and medium-range, solid-fuel and liquid fuel

missiles, capable of carrying different payloads. The Shahab, Qiam, Fateh, Emad, Ghadr, Sejjil,

among others are mass produced and have pride of place at most military parades. Currently,

there are no indications that Iran is actively developing intermediate-range ballistic missiles

(IRBM) or intercontinental-range ballistic missiles (ICBM).[34] For all their sophistication, Iranian

missile systems have been known to suffer from accuracy which would limit the IRGC's ability to

hit fixed targets and thus be sure of inflicting maximum damage on the enemy. To address this

problem Iranian defense engineers and scientists have been given extensive support to improve

targeting capability of the force, leading the Iranian Chief of Staff, Major General Mohammad

Baqeri, to claim that Iran is now capable of producing and deploying missiles that can "land no

more than 10 meters away from their targets."[35]

The stronger and more threatening Iran's missiles appear the more nervous neighbors

and the international community has become, leading to the ballistic missile program being

placed under severe scrutiny. The first category of control includes multilateral scrutiny, which

includes the well-established Missile Technology Control Regime (MTCR),[36] which has been

augmented by the Hague Code of Conduct (HCOC),[37] and the Proliferation Security Initiative.[38]

In addition, the program has been under restrictions imposed by the United Nations Security

Council, the United States, and the European Union. In February 2006 the International Atomic

Energy Agency (IAEA) referred Iran to the Security Council. This laid the ground for a number of resolutions (i.e. 1696 of 2006, 1737 of 2006, 1747 of 2007, 1803 of 2008, and 1929 of 2010) that aimed to freeze Tehran's ballistic missiles. The last one (Resolution 1929 of 2010) specifically stated in Article nine that the security council decided that Iran "shall not undertake any activity related to ballistic missiles…and that states shall take all necessary measures to prevent the transfer of technology or technical assistance to Iran."[39] During the negotiation that led to the signing of the JCPOA Tehran successfully resisted any restrictions on its missile program. Thus, Resolution 2231 of 2015, which supersedes previous resolutions, used much softer language (i.e. "calls upon" instead of "requires"). Given this uncertainty, the Security Council decided in February 2017 that missile testing will be studied at committee level and President Rouhani asserted that Iran "doesn't need anyone's permission to build missiles."[40]

Iran's program has inevitably generated a regional response, mainly the Gulf Cooperation Council (GCC) states and Israel. While the former has aimed to deploy off the shelf U.S.-supplied missile-defense systems, the latter has invested heavily in its sophisticated multilayered system consisting of Arrow, David's Sling, and Iron Dome anti-missile system, including advanced missile counterforce capable of carrying heavy (and non-conventional) payloads to the heart of Iran's urban centers and industrial zones. These components have been largely funded by the United States and have achieved different degrees of accuracy. On the other hand, since the early 1990s Washington has been working with the GCC states to protect their main military and economic installations from potential missile attacks. Some GCC states have purchased and deployed the Patriot Advanced Capability-3 (PAC-3) and the Terminal High Altitude Area Defense (THAAD), one of the most advanced missile defense

systems in the world. However, the United States' efforts to encourage the GCC states to adopt a more coordinated and integrated approach has yielded mixed results, at best.[41] These countries do not share the same threat perceptions and for some the deployment of such systems as THAAD is seen as provocative as well as expensive.

Three conclusions can be drawn from the experience of the last few decades. First, despite tremendous efforts, bilateral, multilateral, and UN sanctions have not succeeded in stopping Iran's missile program. Export restrictions have made it harder and more expensive to acquire crucial components of ballistic missiles, but Tehran has built sophisticated illicit procurement networks, consolidated its strategic cooperation with a number of suppliers, and substantially improved it indigenous capacity. Second, missile-defense systems have their own limitations. True, the United States and its allies have made impressive advances, but it is also true that Iran (along with Russia, China, North Korea, and other countries) have heavily invested in enhancing their missile capabilities. One can argue that the race will likely continue and there will be gaps and limitations on both sides. Third, Iran's ballistic missiles can hit any target in the Middle East, including Israel, GCC states, and U.S. military bases. A close examination of recent conflicts suggests that while the military utility of missiles is limited, they can nevertheless cause deep trauma by inflicting a heavy price on adversaries' population centers and threatening major infrastructures. In other words, they have more political leverage than a military one. This characterization fits well Tehran's broad asymmetrical doctrine and despite sanctions and international pressure, Iran – like North Korea – is likely to keep working on advancing its missile program and testing new missiles.

Cyber Capability

Cyber warfare is a recent addition to any country's defense 'portfolio' and thus differs

fundamentally from such military forces as ballistic missiles and other conventional

deployments. First, governments do not claim responsibility for cyberattacks and in Iran's case

it too does not publicize its cyber warfare capabilities and has not thus far issued a cyber

strategy or doctrine.[42] Tehran's naval and missiles capabilities, on the other hand, are widely

publicized by the official media. Secondly, it is easy to define the source of naval or missile

attacks, whereas cyberattacks are usually carried out by individuals or small groups of people

either independently or sanctioned by governments. This makes it relatively difficult to identify

the culprits, let alone the source of such an attack. Thirdly, while over the last few decades

national and international strategies have been articulated to deter and respond to naval and

missiles attacks, as discussed above, in the cyber arena such strategies and norms are still being

developed. There is no consensus on how to deter or respond to online attacks, nor can they be

easily stopped. Thus, cyber warfare provides Tehran with both defensive and offensive

capabilities, cost-effective and hard-to-detect means to control its critics at home and punish

adversaries abroad. Cyber warfare can take different forms, like sabotage, espionage, and

disruption of services. Generally, the United States, Russia, and China are considered ahead of

other countries, but since the late 2000s Iran has invested substantial resources in developing

its cyber capabilities. More specifically, Iran has sought to develop cyber capabilities in

response to perceived internal, regional, and international threats, particularly on the cultural

level. Iranian leaders often speak of Western cultural invasion and efforts to pollute the minds

of Iranian youth and spread untruths about the regime, so today see the cyber realm as a major

theater of confrontation with the West. Thus, protecting the youth from the appeal of American culture and its 'soft power' has been a constant goal since 1979. But the elite has had a closer encounter with the cyber world and seen it in action in the 2009 contested presidential election which posed a significant threat to domestic stability. It witnessed the leaders of the Green Movement, Mir-Hossein Mousavi and Mehdi Karroubi, utilizing internet-based resources not only to mobilize their followers but also direct them into street protests against the regime. This experience has intensified the authorities' efforts to control and monitor online activities and websites. The Basij-e Mostaz'afin (mobilization of the oppressed in Farsi), an arm of the IRGC, plays a leading role in these efforts.

The last few decades has also witnessed significant advances in electronic warfare and the use of computer programs to jam adversaries' missile guided defense systems.[43] Israel reportedly employed electronic-attack and computer-network-penetration techniques to neutralize Syrian air defenses during the airstrike on al-Kibar nuclear facility in 2007.[44] Three years later (December 2011) Iran claimed that it captured a U.S. stealth drone by jamming its command-and-control downlinks and spoofing its GPS.[45] Although the U.S. denied the Iranian claims and instead suggested that the drone crashed due to a system malfunction,[46] speculation that Iran's cyber warfare capabilities were responsible for the crash has not gone away.

Cyberwarfare is also known to have been waged against nuclear program, as a report by the United States Army's Strategic Studies Institute suggests, describing the discovery of the Stuxnet virus at Iran's nuclear facility Natanz as "the watershed event that spurred the Islamic

Republic to make its cyber capability a priority."[47] The cyber worm is believed to be the first use in the world of an offensive cyber weapon to cause physical damage to an industrial facility.[48] It caused the centrifuges to speed up and slow down erratically, damaging approximately 1,000 machines. Eventually, the Iranians figured out the problem and were able to address it, but not before the Stuxnet virus causing serious disruption in the nuclear program. But Stuxnet was not the only computer virus to infect Iran's networks, and other viruses such as Duqu and Flame (among others) have been discovered since the late 2000s. In response, in May 2012, Ayatollah Khamenei issued a decree creating the Supreme Council of Cyberspace (SCC),[49] the significance of which can be gleaned from its membership, comprising representatives of the supreme leader, the president, speaker of the parliament (Majlis), head of judiciary, director of the Islamic Republic of Iran Broadcasting, minister of information and communication, minister of culture and Islamic Guidance, commander of the IRGC, and the national police chief.[50] The creation of the SCC underscores the increasingly prominent role cyber warfare plays in Iran's national security strategy, leading to the creation of a National Information Network (NIN), an indigenous network accessible only from within the country. In separating the country's internet from the World Wide Web, Tehran hopes to protect its online infrastructure from cyberattacks by domestic and/or foreign enemies.[51]

In addition to these protective measures, there have been reports accusing Iran of carrying out cyberattacks both in the Persian Gulf and the United States. The list includes the Saudi state oil company Aramco, Qatari natural gas firm RasGas, Sands casino in Las Vegas, several major U.S. banks, New York Stock Exchange, and the Bowman Avenue Dam in Rye Brook, New York. These attacks are said to have cost the United States and its allies millions of

dollars.[52] In March 2016 the U.S. Department of Justice indicted seven Iranians for their

involvement in cyberattacks. All of them live in Iran and there are no indications that Tehran

will extradite them.[53]

In addition to these national security drivers, pride is another major reason behind Iran's

substantial investment in cyber capabilities. Similar to the nuclear program, Iranian leaders see

cyber power as a symbol of the country's scientific advancement and an effective tool for

marketing the country as a regional technological hub and an internet-access leader. Indeed,

since the 2010s the government has succeeded in expanding internet access to rural villages

and increasing internet speed in urban centers. Despite political restrictions, Iran today has one

of the largest numbers of internet users in the Middle East, and a substantial blogging

community.[54] Inevitably, Iran's growing cyber capabilities has intensified concern in Washington

and so the 2017 Worldwide Threat Assessment refers to the possibility of cyberattack from

such countries as Iran as a real danger. America's "adversaries," the report notes, "are

becoming more adept at using cyberspace to threaten our interests and advance their own, and

despite improving cyber defenses, nearly all information, communication networks, and

systems will be at risk for years."[55] Iran, along with Russia, China, and North Korea are listed as

the main cyber threats. The emerging consensus is that cyber deterrence should not be

restricted to the cyber domain and the United States must be able to respond to cyberattacks

by all necessary means, including diplomatic, informational, economic, as well as militarily.[56]

The way forward

With few exceptions, since the revolution relations between the United States and its Persian Gulf allies on one side and Iran on the other have been characterized by mutual suspicion and hostility. The conflicts in Iraq, Syria and Yemen today are largely seen as proxy wars between the two sides. Each side claims that they want peace and stability, while blaming the other side for the regional escalated tension. The worsening geopolitical situation has led to an escalation of tensions, with Prince Mohammed bin Salman, Saudi Deputy Crown Prince and Minister of Defense, threatening in May 2017 to take the fight into Iran, stating: "We are not waiting until there becomes a battle in Saudi Arabia, we will work so that it becomes a battle for them in Iran."[57] Brigadier General Hossein Dehqan, Iranian Defense Minister, responded by his own threat, "If the Saudis do anything ignorant, we will leave no area untouched except Mecca and Medina."[58] Within this context of this persistent tension between Washington and its allies and Tehran, Iranian strategists have intensified their asymmetrical defense strategy to confront adversaries with the greater military and financial resources. Naval forces, ballistic missiles, and cyber capabilities have arguably given the Iranians certain advantages. These capabilities are relatively cheap to acquire and maintain, and have the potential to inflict a heavy economic and political price on the adversaries. The broad goal is not, we argue, to fight the United States and its regional allies militarily, but rather to weaken the political will to initiate and sustain military operations. While the threat is omnipresent and the Islamic Republic has never shied away from grandstanding, the United States and its regional allies need to take note of Iran's social dynamism when plotting a more coherent response to the perceived Iranian security threat. Firstly, like any other country, Iran's domestic and foreign policies are shaped by both ideological orientation and perceived national interests. The

experience in Iran suggests that gradually perceived national interest take hold of the leadership and generally these interests come to shape policies. While regime survival is core, economic prosperity, and power projection also play their part in shaping Iran's behavior. But basing its power projection on its Shia identity has proved to be counterproductive, for "as a Persian nation among Arabs and Turks, a Shiite state among Sunnis, there are natural barriers to Iran's reach."[59] Further, evidence suggests that the more incorporated Iran is in the regional and global systems, the more accommodative and less aggressive it becomes. While Iran has never been totally isolated and despite Western pressure has managed to maintain good relations with several of its neighbors and such global powers as China, Russia, India, Japan and indeed the European Union, since the implementation of nuclear deal (January 2016) Iran's international relations have blossomed, leading to Iran-EU trade rising by 78% compared with 2015.[60] Tehran also has further strengthened its economic and strategic ties with Russia, China, India, and other Asian powers. As we have shown, asymmetrical warfare is an essential part of Iran's strategy of survival and once perceived in these terms it should help lift the barriers for closer economic cooperation with the country, eventually leading to a security dialogue which can finally bring Iran into discussions of establishing a regional security framework which can account for the member states national interest from a collective security standpoint. Sadly, the outcome of the American-Arab-Islamic Summit in Riyadh in May 2017 seems to be pointing in the opposite direction and a hardening of approaches to Iran. Ironically, just as Iranians, in their many millions, are pushing their political masters to open up the country to the rest of the world, and engage with the West, the leader of the free world and its regional allies seem to have embarked on a strategy of pushing the Islamic Republic into an isolation box. This

approach, even if not successful, can only strengthen the hands of those who thrive on

strengthening Iran's asymmetric military capabilities, and invite Iran to join forces with those

countries in Europe and Asia who welcome closer economic, social and cultural ties with this

strategically-important country – a country which sits on Eurasia's borderlands and has the

national potential to emerge as one of Asia's powerhouses in the next twenty years.

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