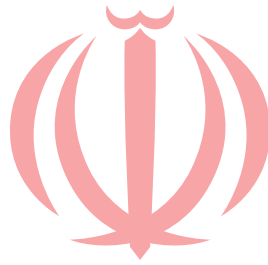


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Iran's Burgeoning Strategic Forces



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1. Ilan Berman, Testimony before the House Foreign Affairs Committee Subcommittee on Terrorism, Nonproliferation, and Trade, May 24, 2017, <http://docs.house.gov/meetings/FA/FA18/20170524/106032/HHRG-115-FA18-Wstate-BermanI-20170524.pdf>.

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Among the Islamic Republic of Iran's central strategic goals are the preservation of its political regime and its ascension to what it views as its rightful place as the regional hegemon of the Middle East. These objectives have put Iran on an adversarial footing with its immediate neighbors, and with much of the international community.

In pursuit of these goals, Iran has invested significantly in the development of its strategic forces, which today includes the region's largest and most diverse arsenal of ballistic missiles, increasingly sophisticated cruise missiles, as well as an array of shorter-ranged anti-ship missiles and air defenses. Iran has also established the technological basis for a nuclear weapons program. This effort has included a blend of overt activities under the auspices of a civilian nuclear energy program, and covert activities aimed at expanding Iran's nuclear weapons potential without international blowback.

The latter effort became the focus of intense international attention following its disclosure in 2003, and of extensive U.S.-led diplomacy under the Obama administration, culminating in the passage of the Joint Comprehensive Plan of Action (JCPOA) in 2015. While many dispute its long-term efficacy, the JCPOA appears to have at least temporarily slowed Iran's advance toward a nuclear weapons capability. No corresponding limitations, however, have been placed upon Iran's strategic delivery systems,

including both ballistic and cruise missiles. As a result of Iranian pressure, the issue of ballistic missiles was placed outside of the "scope of work" of the JCPOA, despite the centrality of these capabilities to the delivery of nuclear weapons. Similarly, as a result of the Iran nuclear deal, strong UN Security Council resolutions curtailing Iran's ballistic missile work have been replaced with weaker language that does not clearly prohibit the Islamic Republic's development and testing of ballistic missiles.

This state of affairs has emboldened Iran to continue its missile development programs, which have seen notable advancements over the past several years. In turn, Iran's missile forces, in tandem with other strategic tools, support a complex national security strategy that both enables the projection of power across the region, and imposes costs on adversaries seeking to directly challenge Iran's regime.

A MORE PERMISSIVE ENVIRONMENT

As experts have noted, the Iran nuclear deal was always "intended to be tactical in nature, focusing on just one aspect of the Iranian regime's rogue behavior: its persistent nuclear ambitions."¹ While this focus may have simplified negotiations between Iran and the P5+1 powers (the U.S., UK, France, Russia, China and Germany), even those with the highest hopes for the long-term efficacy of the JCPOA cannot deny that the agreement entirely neglects significant aspects of



malign Iranian behavior. In fact, mounting evidence suggests that the structure of the nuclear deal, its limitations, and its associated provisions have actually had the opposite of their intended effect, abetting and emboldening Iranian behavior and capabilities that fall outside of the parameters of the JCPOA.

Perhaps the most significant of these is Iran’s ballistic and cruise missile development programs. Even without nuclear weapons, these forces give Iran the ability to impose significant costs upon the United States and its regional partners should conflict occur. They also provide Iran with a kind of deterrent cover to pursue its malign activities in the region with less perceived risk of direct military confrontation with the United States, the Gulf Cooperation Council states, and/or Israel. Such a dynamic could easily lead to strategic miscalculation and conflict.

United Nations Security Council Resolution (UNSCR) 2231 notably only restricts development of those missiles “designed to be capable” of delivering nuclear weapons. The resolution it replaced, UNSCR 1929, was stricter, stating that “Iran shall not undertake any activity related to ballistic missiles capable of delivering nuclear weapons, including launches using ballistic missile technology.”²

While the linguistic change may seem slight, a revealing March 2015 press release clearly shows that the shift was not lost on Iran, with the Iranian UN delegation observing that, “Security Council Resolution 2231 does not prohibit legitimate and conventional military activities, nor does international

law disallow them. Iran has never sought to acquire a nuclear weapon and never will in the future, as it fully honours its commitment under the NPT and the JCPOA. Consequently, Iran’s missiles are not and could not be designed for delivery of unconventional weapons.”³ In effect, Iran has maintained that, because it presumably has no intention to acquire nuclear status, any and all missile-related activities pursued by the regime are therefore legitimate.

The U.S. government does not share this view, however. Administration officials have declared Iran’s recent ballistic missile testing and proliferation to be “in defiance” of UNSCR 2231.⁴ The U.S. intelligence community has furthermore assessed that—irrespective of Tehran’s public denials—Iran’s ballistic missiles are “inherently capable of delivering WMD.”⁵

Moreover, while Iran did significantly reduce its missile testing during the period of multilateral negotiations over the JCPOA, it resumed them shortly after the deal was concluded in July 2015. Since then, Iran may have conducted as many as 25 launches of ballistic missiles, cruise missiles, and satellite launch vehicles.⁶

Notably, Iranian officials are eager to avert possible consequences for their ballistic missile work. Thus, in October of 2017, on the heels of the Trump administration’s unveiling of a new “comprehensive” Iran strategy designed to, among other things, curtail the ballistic missile threat from Iran, the country’s Supreme Leader, Ali Khamenei, unilaterally announced that he would henceforth restrict the range of the country’s indigenously-

2. United Nations, “Security Council, Resolution 2231 (2015) Adopted by the Security Council at its 7488th meeting, on 20 July 2015,” July 20, 2015, http://www.un.org/en/ga/search/view_doc.asp?symbol=S/RES/2231%282015%29.
3. Press release by the Permanent Mission of the Islamic Republic of Iran to the United Nations, as cited in Kathleen H. Hicks and Melissa G. Dalton, *Deterring Iran After the Nuclear Deal* (Washington, DC: CSIS, March 2017).
4. Secretary of State Rex Tillerson, *Remarks at the U.S. Department of State*, Washington, DC, April 19, 2017, <https://www.state.gov/secretary/remarks/2017/04/270341.htm>.
5. Director of National Intelligence Dan Coats, as cited in Adam Kredo, “Intel Report: Iran Refining Nuke Pathway System in Flagrant Violation of Ban,” *Washington Free Beacon*, May 12, 2017, <http://freebeacon.com/national-security/intel-report-iran-refining-nuke-delivery-system-flagrant-violation-ban/>.
6. “Iranian Missile Launches: 1988-Present,” *Missile Threat*, n.d., <https://missilethreat.csis.org/iranian-missile-launches-1988-present/>.
7. Kelsey Davenport, “Iran’s Leader Sets Missile Range Limit,” *Arms Control Today*,



- December 2017, <https://www.armscontrol.org/act/2017-12/news/iran%E2%80%99s-leader-sets-missile-range-limit>.
8. "Iran to widen missile range 'if threatened by Europe,'" *Al Jazeera* (Doha), November 26, 2017, <http://www.aljazeera.com/news/2017/11/iran-widen-missile-range-threatened-europe-17112612301158.html>.
 9. "Shahab-3 Variants," *Missile Threat*, n.d., <http://missilethreat.csis.org/missile/shahab-3-variants-amad-ghadr>.
 10. Idrees Ali, "Iran tested medium-range ballistic missile: U.S. official," *Reuters*, January 30, 2017, <https://www.reuters.com/article/us-usa-iran-missiles/iran-tested-medium-range-ballistic-missile-u-s-official-idUSKBN15E2EZ>.
 11. "Khorramshahr," *Missile Threat*, <https://missilethreat.csis.org/missile/khorramshahr/>.
 12. Bilal Y. Saab and Michael Elleman, *Precision Fire: A Strategic Assessment of Iran's Conventional Missile Program* (Washington, DC: Atlantic Council, September 2016), http://www.atlanticcouncil.org/images/publications/Precision_Fire_web_0907.pdf.

produced missiles to 2,000 kilometers.⁷

This range, however, still permits Iran to strike targets throughout the entire Middle East, as well as in parts of southeastern Europe. Furthermore, because the restriction is self-imposed, there is no way to independently verify Iran's compliance with its own caps. Likewise, the restriction makes no mention of payload weights, significant because the full extent of a missile's maximum range can be masked by testing it with a heavier payload. Finally, Khamenei's declaration is confined to ballistic missiles, with no corresponding commitments from Iran's leadership to limit any other kinds of missiles, such as cruise missiles, air defenses, or anti-ship capabilities.

Indeed, there is nothing to stop the Iranian regime from increasing the range of its missiles if short order should it choose to do so. In fact, Iran's leaders have already threatened to do just that.⁸ Nor do the self-imposed caps slow the progress that Iran is making in the quantity and quality of its missile forces—particularly in guidance, accuracy and warhead lethality. In short, the Supreme Leader's announcement may make for good diplomacy, but it does little to change the strategic environment facing the U.S. and regional partners. Nor should it be seen as a substitute for formalized and verifiable caps on Iran's ballistic missile program. That program, meanwhile, is evolving substantially.

IRAN'S MISSILE FORCES

Iran's currently deployed forces can roughly be divided into two categories: short-to-medium range ballistic and cruise missiles meant to hold at risk

urban areas, civilian infrastructure and potentially larger military installations, and; shorter-range tactical missile systems, such as anti-ship and air defense systems, meant to contest access and control of strategically sensitive areas such the Arabian Gulf and the Strait of Hormuz. These forces and doctrines work in concert to support a cost-imposing strategy against adversaries that confront Iran militarily.

Ballistic Missiles

The backbone of Iran's MRBM fleet is the *Shahab-3* series of ballistic missiles, which is based on the North Korean *No-Dong*. The *Shahab* was first tested in 1998. More recently, Iran has unveiled and tested other *Shahab-3* variants such as the *Ghadr* and *Emad*, which Iran claims have greater accuracy.⁹ The *Shahab-3* and its variants have estimated ranges of between 1,300-2,000 km and are road-mobile. Iran also tested a new kind of liquid fueled medium or intermediate range ballistic missile in January 2017, which Iran has dubbed the *Khorramshahr*.¹⁰ Little is as yet known about this missile, other than that it appears distinct from the *Shahab-3* lineage and may share some characteristics with North Korea's *Musudan* IRBM.¹¹

Iran has also developed a line of two-stage, solid-fuel missiles known as the *Sejjil*. The *Sejjil*, however, has not been flight-tested since 2011, and it is unclear whether it has become operational in the intervening years.

While these missiles allow Iran to strike targets as far away as Israel



and possibly parts of southeast Europe, they do have several shortcomings that limit their utility. For instance, most are liquid-fueled, and thus require a lengthy fueling process prior to launch. If and when it becomes fully operational, the solid-fueled *Sejjil* would overcome this challenge, shortening launch times from hours to minutes.

Iran's MRBMs also have poor accuracy at present.¹² Estimates of the *Shahab-3*'s accuracy go as high as 2.5 km circular error probable (CEP), which would make it suitable only for striking very large targets, such as cities, and quite indiscriminately at that.¹³ The *Ghadr* and *Emad* variants likely have improved accuracy (between 1-1.5 km CEP), yet both are still far from what would be required to reliably destroy military targets with conventional warheads.¹⁴ Quantity may also be a limitation. Estimates of the number of operational Iranian MRBMs average between 30-100 missiles, with only 30-50 accompanying launchers.¹⁵

Iran's supply of short-range ballistic missiles and rockets, by contrast, is far greater. Iran's SRBMs and rockets include the *Scud*-based *Shahab-1* and *2*, the *Fateh-110*, the more recently revealed *Qiam-1*, and the *Fajr*.¹⁶ These missiles have estimated ranges of between 200-500 km, depending on assumptions of payload weight and other technical characteristics.

In the late 1990s, Iran began development of the *Fateh*-family of short-range solid fuel ballistic missiles, which include the *Fateh 110* and newer *Zolfaghar*—the latter of which has a range of 700-800 km, and may be equipped with a

submunition payload.¹⁷ In June 2017, Iran reportedly launched 5-6 *Zolfaghar* missiles against ISIS targets in Syria, purportedly in response to attacks carried out by supporters of the terrorist group in Tehran.¹⁸

The *Fateh* family also has several anti-ship variants, including the *Hormuz 1* and *2*, and the *Khalij Fars*. Iran claims these missiles have ranges of around 300 km, and are equipped with various kinds of more advanced guidance systems such electro-optical and anti-radiation homing terminal seekers.¹⁹

Cruise Missiles

In addition to its ballistic missiles, Iran deploys numerous cruise missile systems. Perhaps most well known is its recently acquired *Soumar*, a long-range land attack cruise missile with an estimated range of between 2,000-3,000 kilometers. This missile is likely based on the Russian *Kh-55*, which Iran acquired from Ukraine in 2001.²⁰ While some analysts have expressed skepticism about the *Soumar*'s reliability and real capabilities, it might be unwise to discount it. If the *Soumar* can perform as advertised, it would give Iran a unique alternative way to execute long-range strikes against adversaries, and its low flight profile would create an additional challenge for regional missile defenses that are currently optimized for ballistic missile defense.

Equally, if not more, strategically significant is Iran's deep cache of anti-ship cruise missiles (ASCMs). The bulk of Iran's anti-ship missile force is comprised of domestically produced *Ghadir*, *Qader* and *Noor* missiles with ranges of between 120-300 km.²¹ This gives Iran

13. "Shahab 3," *Missile Threat*, n.d., <https://missilethreat.csis.org/missile/shahab-3/>.
14. John Chipman et al, *Missile Defence Cooperation in the Gulf* (London: International Institute for Strategic Studies, 2016), 33.
15. Ibid, 27; U.S. Air Force National Air and Space Intelligence Center, *Ballistic and Cruise Missile Threat* (2013), 14.
16. Ibid.
17. Jeremy Binnie, "Iran Claims Zolfaghar Missile Has 700 km Range," IHS Jane's *Defense Weekly*, September 28, 2016, <http://www.janes.com/article/64149/iran-claims-zolfaghar-missile-has-700-km-range>.
18. Saeed Kamali Dehghan, "Iran targets 'terrorists' in missile strike on ISIS-held Syrian town," *Guardian* (London), June 18, 2017, <https://www.theguardian.com/world/2017/jun/18/iran-targets-terrorists-in-missile-strike-on-isis-held-syrian-town>.
19. *Iranian Naval Forces: A Tale of Two Navies* (Office of Naval Intelligence, February 2017), 33, <http://www.oni.navy.mil/Portals/12/Intel%20agencies/iran/Iran%20022217S.pdf?ver=2017-02-28-082613-220>.
20. Paul Kerr, "Ukraine Admits Missile Transfers," *Arms Control Today*, May 2005, https://www.armscontrol.org/act/2005_05/Ukraine.
21. *Iranian Naval Forces: A Tale of Two Navies*, 32.
22. Ibid, 33.
23. "Iran Said Seeking Russian Cruise Missiles Ahead of Weapons Ban Expiration," *Radio Free Europe/Radio Liberty*, March 4, 2017, <https://www.rferl.org/a/iran-said-seeking-russian-cruise-missiles->



- ahead-un-weapons-ban-expiration/28349940.html.
24. Parisa Hafezi, "Iran deploys Russian-made S-300 missiles at its Fordow nuclear site: TV," Reuters, August 29, 2016, <http://www.reuters.com/article/us-iran-missiles-fordow-idUSKCN1140YD>.
 25. Iran's air defense forces includes variants of the SA-5, SA-6, SA-15 and SA-22, from Russia, the Chinese HQ-2, and a large supply of MIM-23B HAWK interceptors acquired from the United States in the mid-1970s. In the late 1960s and early 1970s, Iran imported significant numbers of Tigercat and Rapier air defenses from Europe, but it is unknown how many of these remain operational. Christopher F. Foss and James C. O'Halloran, IHS Jane's *Land Warfare Platforms: Artillery and Air Defense* (London: IHS Janes, 2016-2017), 939.
 26. Sharif Sokkary, "A United States Marine's View of the Artesh and IRBC," Middle East Institute, November 15, 2011, <http://www.mei.edu/content/united-states-marines-view-artesh-and-irgc>.
 27. Hossein Aryan, "The Artesh: Iran's Marginalized and Under-Armed Conventional Military," *Middle East Institute Viewpoints*, November 2011, 49, <http://www.mei.edu/sites/default/files/publications/2011.11.The%20Artesh%20Full%20PDF.pdf>.

maritime strike capabilities across the whole of the Arabian Gulf from land-based positions along its coast. But as with its other missile systems, Iran is not sitting still. According to the Office of Naval Intelligence, "Iranian [Coastal Defense Cruise Missiles] continue to evolve in all categories including, range, speed, flight profile, autonomy, seeker, and destructiveness."²²

Reports also indicate that Iran is seeking to import more advanced ASCMs such as the Russian *Yakhont* system.²³ Such an acquisition would further bolster Iran's ability to threaten U.S. and GCC naval forces in the Persian Gulf, and could even be used to strike other coastal and sea-based installations such as oil rigs and desalination plants.

Air Defenses

Improving its air defenses has been another priority by which Iran's regime has sought to support its cost-imposing deterrence posture. Russia completed its first deliveries of the S-300 air defense systems to Iran in May 2016, after the JCPOA lifted the long-running arms embargo levied on Iran's acquisition of certain kinds of weapons systems. Iran promptly deployed these units to defend its Fordow uranium enrichment facility.²⁴ These imported systems are being integrated with Iran's indigenously produced *Bhavar-373* air defense system, which bears a striking resemblance to the S-300. Iran also possesses other air defense systems, mainly older Russian and Chinese models, as well as antiquated U.S. systems acquired during the days of the Shah.²⁵

But despite its diversity of systems, the bulk of Iran's air defenses are obsolete,

very short-range, and lower tier, and likely vulnerable to electronic warfare such as jamming. Iran's sheer size and mountainous terrain furthermore provide a key advantage to an aerial attacker, as these natural elements limit the line of sight for Iranian radars.²⁶ As such, Iran must concentrate its air defense around a few key strategic points and likely targets, such as command and control centers in Tehran, its nuclear infrastructure, and its strategic missile bases.²⁷ This leaves many of its land and naval forces vulnerable to U.S. and GCC air power.

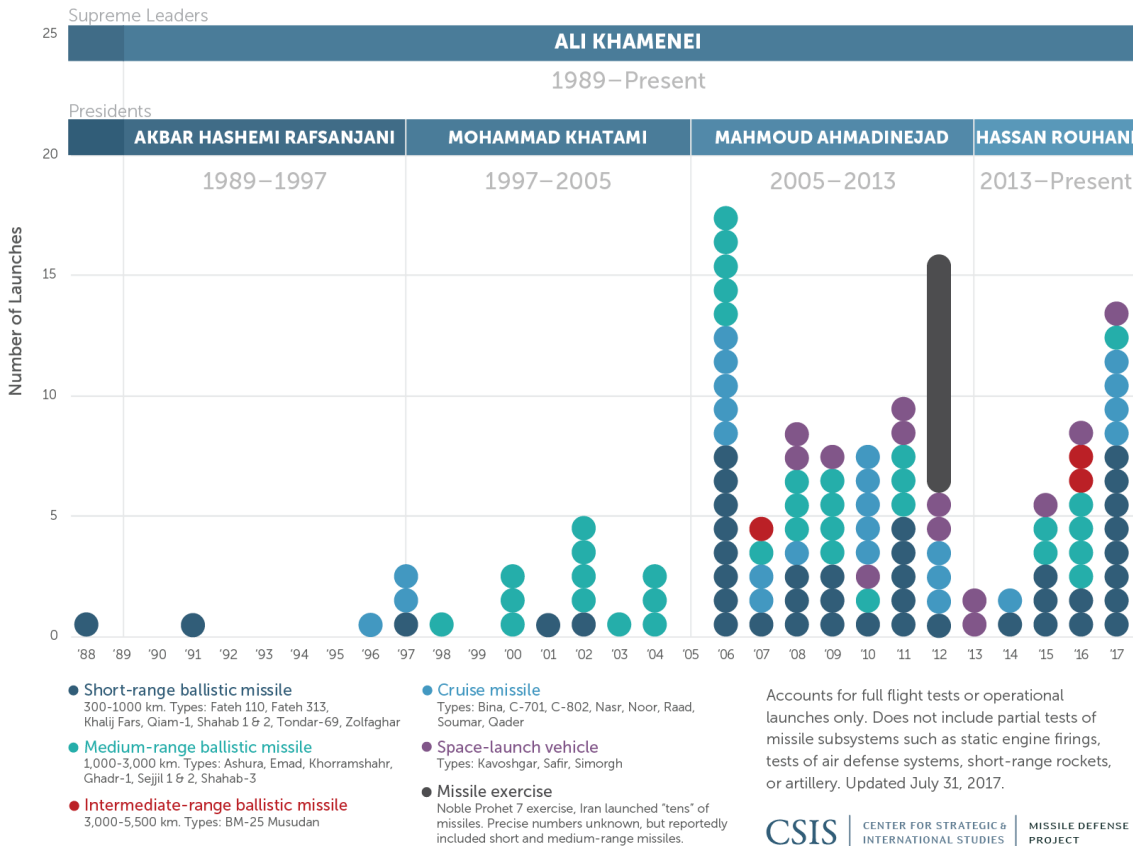
As Iran becomes less and less resource constrained, it will likely be able to thicken its air defenses with more sophisticated technology through imports, augmented by domestically produced systems. Russia's rapid delivery of the sophisticated S-300 upon the conclusion of the JCPOA may prove merely a preview of things to come. Should this bear out, a military option against Iran's nuclear facilities may become more complicated and costly as time progresses.

SHARING THE WEALTH

By raising the threshold for external attacks on the regime, Iran has made itself more and more insulated, thereby empowering the continuation of its regional subversive activities via its terrorist proxies and its clerical army, the Islamic Revolutionary Guard Corps (IRGC). The export of rockets and missiles, meanwhile, provides a means to empower the Iranian regime's proxies and partners, including Hamas in the Palestinian Territories, Hezbollah in Lebanon, the Assad regime in Syria, and Houthi rebels in Yemen.



IRANIAN MISSILE LAUNCHES



Iran has become adept at proliferating these weapons to its proxies via sophisticated smuggling operations, as well as by establishing local missile and rocket production and assembly facilities. This proliferation not only increases the lethality of these groups, but also gives Iran strategic influence over them. Iran can then use these groups, particularly Hezbollah, to horizontally escalate a conflict, adding yet another layer to Iran’s cost-imposing strategy.

Developments in the accuracy of Iranian missiles and rockets may also portend challenges ahead for regional missile defenses. Advances in missile technology tend to begin in Iran’s larger ballistic missile systems, and trickle

down to its shorter-range rocket exports. Should the rockets possessed by groups such as Hamas or Hezbollah become more accurate, it could spell trouble for defensive systems like Israel’s *Iron Dome*, which currently needs only to engage a minority of rockets fired into Israel. Should the accuracy of those rockets improve, *Iron Dome* capacity could come under serious strain.

Iran’s missile and rocket proliferation can also be plainly seen in the current conflict in Yemen. While most of the Iranian-origin missiles deployed by Yemen’s Houthi rebels have been intercepted by GCC air and missile defense forces, Houthi militants have been able to attack several ships at sea with Iranian

28. “Interactive: The Missile War in Yemen,” *Missile Threat*, n.d., <https://missilethreat.csis.org/missile-war-yemen/>.
29. “Qiam-1,” *Missile Threat*, n.d., <https://missilethreat.csis.org/missile/qiam-1/>.
30. “Yemen’s Houthi group says fires missile toward Abu Dhabi nuclear reactor,” Reuters, December 3, 2017, <https://www.reuters.com/article/yemen-security-emirates/update-1-yemens-houthi-group-says-fires-missile-toward-abu-dhabi-nuclear-reactor-idUSL8N103065>.
31. Michelle Nichols, “U.N. says missiles fired at Saudi Arabia have ‘common origin,’” Reuters, December 9, 2017, <https://www.reuters.com/article/us-yemen-security-un/u-n-says-missiles-fired-at-saudi-arabia-have-common-origin-idUSKBN1E30QU>.
32. Vice Admiral J.D. Syring, USN, Statement before the House Armed Services Committee Subcommittee on Strategic Forces, June 7, 2017, https://www.mda.mil/global/documents/pdf/FY18_WrittenStatement_HASC_SFS_PDF.
33. Eric Edelman, Statement before the Senate Armed Services Committee, August 5, 2015, <https://www.armed-services.senate.gov/hearings/15-08-04-the-joint-comprehensive-plan-of-action-jcpoa-and-the-military-balance-in-the-middle-east>.



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supplied anti-ship cruise missiles.²⁸ The ballistic missile that the Houthis fired against Riyadh in November 2017 also appeared to be a copy of Iran’s *Qiam-1*, a more sophisticated *Scud* variant with a lower radar signature and separating warhead.²⁹ Also worrisome was the Houthis’ reported launch of a cruise missile, identical to Iran’s long-range *Soumar*, against a nuclear power plant in the UAE.³⁰ There is no evidence that the missile reached its target, but the incident illustrates an expansion of the support Iran is providing to its Yemeni proxy. Despite denials by Tehran, a recent United Nations report concluded that the missiles fired by Houthi forces share a “common origin” with those deployed by Iran.³¹

FUTURE TRAJECTORY

The election (and reelection) of President Hassan Rouhani and the signing of JCPOA have not slowed Iran’s missile development. Indeed, Iran’s current tempo of missile activity is approaching the same levels observed under the tenure of the country’s previous president, Mahmoud Ahmadinejad—with the exception of a two-year partial hiatus during Iran’s negotiations with the West over the JCPOA. This fact, along with Rouhani’s explicit rejection of any limits on missile development, demonstrates that Iran is likely to continue advancing its missile capabilities, both in terms of quantity and of quality.

Additionally, although Iran does not appear to be overtly seeking missiles capable of reaching the United States, it does have an active space launch program—technology that experts have noted “could shorten a pathway to an ICBM.”³² As with its nuclear program,

Iran appears to be creating a bridge to an ICBM capability under the guise of a peaceful program.

Improvements in the accuracy and lethality of Iran’s missiles raise the prospects that Iran could soon have the capability to seriously cripple U.S. and GCC air power in a first strike. Forward deployed U.S. air assets in Arabian Gulf region are the core of U.S. regional military power, and any such threat to these forces could prove highly destabilizing. Yet that is precisely the dynamic that has begun to emerge. As one expert has noted, if Iran’s strategic capabilities are left unchecked, “the United States will not be able to rely, as it has for the past 30 years, on an assumption that it will have unimpeded access and control in all the domains of warfare in the Persian Gulf.”³³